

NCTA opposes digital must carry

Anstrom labels "ridiculous" the argument that mandated carriage on cable is key to transition to digital TV

By Paige Albinlak

Cable is committed to giving its customers digital television, but it is firmly against any digital must-carry regulations, National Cable Television President Decker Anstrom said last week.

"The idea that must carry is central to the transition to digital television is simply ridiculous," he says.

Broadcasters say that there is no difference between digital and analog must carry. "Must carry is the law of the land in the analog TV world. We think it also applies in the digital world," says Dennis Wharton, NAB spokesman.

"Digital must carry is absolutely essential in order for Americans to receive the highest-quality television the world has ever seen," Wharton says. "If cable has not been preparing for the transition to digital television, what have the operators been doing with the outrageous rate increases they have been foisting upon the American public for the past 10 years?"

Anstrom wants cable operators and broadcasters to have the flexibility to negotiate carriage of digital channels without government interference. He says that cable operators and broadcasters have been holding such talks for the past several months.

Anstrom says that imposing digital must-carry rules on cable will hurt cable subscribers, because limited capacity will cause cable operators to drop cable networks in order to carry broadcasters' digital channels. In Washington, for example, TCI-owned system District Cablevision would have to drop four cable networks in order to pick up one full digital channel for each of the four major broadcast networks.

In the early phases of the transition, Anstrom says, only those wealthy enough to buy a \$7,000-\$10,000 digital television will be able to receive high-definition signals.

"A few hundred rich people [would] get a few hours a week of as-yet unknown HDTV programming—and everyone [would lose] four cable networks," Anstrom says. "We encourage the FCC and broadcasters to explain

that to our customers if must carry is imposed for digital TV."

Although the cable industry argues that it should not be burdened with digital must carry as cable develops its digital technology, NCTA also says that direct broadcast satellite companies should have to face must-carry regulations if that industry wants to provide local broadcast signals in local markets.

Critics say that position is inconsistent, but Anstrom says the must-carry situation is different for DBS.

"We are not asking to repeal analog must carry," Anstrom said, responding



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—Decker Anstrom

to a question about whether NCTA's positions on DBS and digital must carry were inconsistent. "With the launch this spring of EchoStar 3 and 4, [EchoStar CEO] Charlie Ergen has all the capacity he needs to provide local signals."

Providing all broadcasters' local signals in all the local markets that EchoStar serves would allow it to offer service in only five or six markets,

Ergen maintains. Ergen claims that EchoStar needs to serve at least 20 markets in order to make putting local broadcast signals in local markets economically feasible. ■

All set for advanced set-tops?

The new digital cable boxes are here; the question is: what do viewers want from them?

By Jon Healey, B&C correspondent

The cable industry soon will start deploying advanced digital set-top boxes that have enough computing horsepower to deliver practically any information or entertainment that can travel over a wire.

You want 500 channels? No problem. Video e-mail? Sure. Order a tape of the program you just watched, play a game with your nephew in Dubuque, call a friend while you surf the Internet, file your taxes electronically? Step right up.

The real question isn't what the new set-tops make possible—it's what people might want to do with that power. And the answer to that question, cable executives and industry observers suggest, is that people want something that looks and feels like TV.

"The thing that they want more than anything," says Ken Morse of PowerTV, a Silicon Valley company that develops software for advanced set-top boxes, "is just video. That's the cornerstone of why set-tops exist, and it will always be the case. ... If we think we're going to change people's viewing habits

overnight, we're sadly mistaken."

"Everybody's got to be patient here," says Steve Effros, president of the Cable Telecommunications Association. "These are extremely expensive, complicated infrastructures to build. There are all sorts of battles over standards and what qualities consumers want and how they should be able to buy them."

Most operators are expected to proceed slowly into the digital future as they try to puzzle out just what their customers want. "We're not of the ilk [to say]: 'Build it and they will come,'" says Jim O'Brien, president of operations for Jones Intercable Inc. "We probably don't know what we don't know at this point, candidly, in terms of where this will go," O'Brien adds. "I think clearly we need to be cautious, because you don't want to make a lot of wrong bets."

The strategy at Tele-Communications Inc., on the other hand, is to make a lot of interactive services available as soon as the advanced set-top box gets deployed. This approach is driven by TCI's desire to have the companies providing such services help cover the cost of the box. The question of what

consumers want bedevils programmers and operators alike. John O. "Dubby" Wynne, president of Landmark Communications, the owner of The Weather Channel, says: "The truth is, we're all struggling, trying to figure that out. We're all experimenting."

"The way to find out is develop an attractive product and bring it to market," says Joe Cece, a senior vice president at Cablevision Systems Corp.

This time we mean it

Cable and phone company executives have been heralding a new generation of video services for the better part of the decade, but the vast majority of consumers have seen no real change on their TV screens. Interactive television was supposed to be the Next Big Thing five years ago, when Time Warner, Bell Atlantic and others built pioneering two-way networks for video on demand, electronic commerce and other advanced services. Those efforts sank under the weight of their prohibitive costs, however, prompting a backlash among investors. "What we all learned out of that is, there's a bit of dis-

tance between engineering and stock-market hype and consumer desire," says Tom Wolzien, media analyst for Sanford C. Bernstein & Co.

The fact that interactive TV fizzled in the early 1990s doesn't prove that the public rejects such services. It may just show that the time and the approach weren't right.

Adam Grosser of @Home, a cable-backed provider of high-speed Internet access services, says that the earlier efforts relied on proprietary technology, so programs and services had to be developed uniquely for each version. By contrast, the cable industry's current effort tries to take advantage of what's already being developed for the Internet.

"There are 8 billion people creating content for [the Internet]. We may selectively filter some of it, but we are going to leverage the commerce applications, the graphics, the video, the tremendous ground swell of activity," says Grosser, @Home's vice president for product development.

The surging popularity of the Internet also is making more consumers familiar with the benefits of interactivity, so the idea of blending TV and PC is less alien to the average viewer than it used to be. "It has more of a shot of working today than it did a few years ago," Wolzien says.

Cable operators don't have to rebuild their networks or buy new set-tops to provide interactive services. They don't even have to convert to digital. The industry consensus, though, is that the greatest opportunities for new services exist on two-way digital systems. While some operators are well on their way to that goal, the industry as a whole is several years away.

Eric Buck, a cable analyst at Donaldson Lufkin and Jenrette, estimates that only about 20% of all cable systems are capable of carrying signals in both directions, and only 5% are actually delivering two-way service. Roughly one-fourth of U.S. homes, meanwhile, are passed by digital cable systems, judging by estimates from the two leading suppliers of set-top boxes.

The pace of digital rollouts could accelerate once the industry's research arm, Cable Television Laboratories Inc., finishes the specifications for advanced digital set-tops. That work, dubbed "OpenCable," has been going

on formally since September, with the first draft expected around the time that the National Cable Television Association convenes in Atlanta on May 3-6.

The process has four main goals, says Bill Schleyer, chairman of the OpenCable initiative: to give cable operators a platform for new services; to make networks interoperable, so that they may be linked; to attract new suppliers to the industry, and to enable consumer electronics companies to manufacture set-top boxes and digital cable-ready TV sets that can work on any system.

When the final specifications are released later this year, they are expected to outline two versions of the box, one with more capabilities and a higher price tag than the other. The main elements of both versions will include:

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calling the only cable service in town and ... the other products enabled by the new set-tops. "I think the mind-set is going to change."

- The ability to provide more channels of video through digital compression

- A powerful microprocessor and a fair amount of memory, comparable to a popular configuration for personal computers in 1997

- A high-speed cable modem and a way to display Internet information on a TV set

- Support for the programming language used to display World Wide Web pages and for some version of Sun Microsystems' Java, another programming language used in applications distributed over the Internet

- The capability of displaying a combination of data and television signals

- The ability to pass high-definition television broadcasts on to digital TV sets or, possibly, to decode those broadcasts for display on conventional sets.

Most of these features will be active only if the cable operator invests in some additional equipment at the headend, such as a server for electronic mail. In that sense, the advanced boxes are like network computers: They will borrow many of their functions from centralized

servers rather than having them built in.

How soon is now?

Time Warner, which has been working on advanced digital boxes since early 1996, expects to try out the first OpenCable-style boxes within the next two months, according to spokesman Mike Luftman. Those boxes are made by Scientific-Atlanta, which plans to install two-way digital networks in 27 major metropolitan areas for Time Warner and eight other operators by July, according to Allen Ecker, TW's chief technology officer and president of subscriber systems.

TCI is still deciding on the components for the advanced set-tops it commissioned last year as part of a massive

box order from General Instrument Corp. A group of cable operators joined TCI in ordering up to 15 million of the boxes, to be delivered over the next several years. In the meantime, however, TCI continues to roll out a basic digital service as a way to boost its channel capacity. The company has installed close to 200,000 basic digital boxes since early 1997, with plans to reach 1 million by the end of the 1998.

Dave Fritch, senior manager for marketing and strategy at General Instrument, says that the company has shipped 1 million first-generation digital set-tops. Cable networks with G-I digital headends now pass some 25 million U.S. homes, he adds.

TCI isn't breaking any new ground with its first round of digital set-tops, however. Although the devices can deliver a variety of interactive services, TCI is using them only to pack more channels onto its systems, provide a better program guide and enable viewers to order pay per view through their remote controls.

Like TCI, Texas-based Buford Cable was an early proponent of digital technology as a way to compete with satellite services that offered far more channels. Using digital programming from TCI's Headend in the Sky, Buford has boosted its system in Heath, Tex., from fewer than 40 channels to more than 140.

What customers want, says Ben Hooks, Buford president, is nothing fancy: It's better service and more channels. "Every time I do a survey,

they want more product."

O'Brien of Jones Intercable isn't so sure. "If we devise a digital strategy that allows us to deliver hundreds of channels, if consumers don't want it or don't want to pay for it, we're wasting our time," he says, noting that the average consumer watches only seven to 10 channels of programming regularly.

For TCI, selling the digital tier hasn't been much of a stretch—it's more channels of cable TV. Some observers question whether the cable industry will know how to sell the new services that advanced set-top boxes enable, ones that have little to do with movies, sports and other familiar forms of TV entertainment. "They're used to letting the material sell itself," says Arthur Orduna of Microware, a company that makes software for set-top boxes. "Selling new technology is an order of magnitude more difficult, and it has to be done to that same subscriber who already has a level of distrust or unease toward their cable company."

"I think the mind-set is going to change," OpenCable's Schleyer says. The larger cable operators, he adds, recognize that there is a big difference between selling the only cable service in town and offering high-speed data, interactive gaming and the other products enabled by the new set-tops.

These companies are reaching outside the industry for marketing help, Schleyer says, adding that the change is crucial to the success of new services. If they try to run the next generation of services with the same people and same marketing ideas as before, he says, "it's going nowhere."

The high-tech companies that are joining forces with the cable industry also have done a better job of testing the market than their new partners have done. When cable executives started talking to the likes of Intel, Microsoft and Sun, they were astounded by the research those companies had done, Schleyer says. "They know a lot more about what our customers wanted than we knew. It's embarrassing to admit. It was an eye-opener."

TCI, Time Warner and several other operators are cutting their marketing teeth for interactive products by offering high-speed Internet access through cable modems in a handful of communities. Although demand for the service

seems strong among computer users, the cable companies have been slow to provide it because of the lack of standards for cable modems and the labor-intensive installations. Both problems are expected to be solved by the end of this year or early 1999, when the computer industry starts producing built-in or plug-and-play modems to specifications developed by CableLabs.

The Holy Grail

One of the raps against the concept of interactive TV was that it demanded more effort than the typical couch potato cared to exert. In fact, General Instrument's Fritch says, the opposite is true of many services made possible by the advanced set-top boxes: "What a lot of these services offer is a convenience factor that's not

PowerTV's Ken Morse says that

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there right now." For example, the built-in cable modems make it possible to read e-mail or call up a Web page without having to boot up a computer or dial into the Internet.

Video on demand may be the ultimate in convenience, bringing the contents of a video-rental store into the consumer's living room. True video on demand also brings the functions of a VCR to the set-top box, allowing viewers to start, stop, pause, rewind and fast-forward programs whenever they wish. It is the one advanced service that cable operators are most eager to offer, says PowerTV's Morse, in part because it is so closely related to the services they already sell.

Both Time Warner and Bell Atlantic found in their market trials that consumers craved video on demand, ordering movies more often than they used to rent them at their local Blockbuster—a far greater rate than the typical pay-per-view system produces. Video on demand was shelved, however, because the equipment was prohibitively expensive. Those costs have plummeted since

then, however, thanks to more powerful microprocessors, less costly data storage and better routers, according to Time Warner spokesman Luftman.

The next-generation Scientific-Atlanta set-top box that Time Warner has been testing will be able to provide video on demand once the necessary video servers and routers are installed at the headend, Luftman says. Morse predicts that such services will be turned on by the end of 1998, "not in trials, in real deployments."

Several companies have developed competing approaches to video on demand. The one that seems to have an inside track on the Scientific-Atlanta box is Intertainer Inc. of Santa Monica, Calif., whose music, video and electronic commerce service is based on Java. The initial version of the service runs on personal computers but is being adapted for set-top boxes.

"The Internet taught us that we want what we want when we want it," says Jonathan Taplin, the company's co-chairman and co-chief executive. "Everything else works on your time schedule but TV. If there's an evolution that digital can offer, that's it."

Tuning in the Internet

Before they go to the expense of offering video on demand, cable operators are likely to implement one of the more modest features of the new boxes: electronic mail.

"E-mail is going to be a big driver," says PowerTV's Morse. The popularity of e-mail over the television has been demonstrated by Microsoft's WebTV, a device that displays the Internet on TV sets. Morse says that the e-mail use on WebTV has been phenomenal, particularly in Florida, with its large population of retirees.

The advanced set-tops' built-in cable modems also could be used to surf the Web on TV, but Morse and others question whether many people would want such a function. To perform well on the congestion-clogged Internet, Websites have to minimize the amount of video and graphics on their pages, making them pale in comparison to the swirl of energy and motion found in most television programming.

Hal Krisbergh, chairman of WorldGate Communications, disputes the notion that the Web is boring on TV. A former top executive at General Instrument, Krisbergh's current company

Digital Set-Top Boxes

enables cable viewers to tune in Web sites related to the programs they're watching. "The idea that the TV set is a passive, couch-potato box is coming from a group of people who don't understand what a television is," Krisbergh says. A channel surfer, like someone browsing the Web on computer, interacts fully with the TV set. "When he gets in front of that TV, he wants to be entertained. ... And the Internet is very capable of being entertaining," Krisbergh says.

Still, WorldGate is moving in the same direction as Microsoft, Network Computer Inc., Intel, @Home and the numerous other companies exploring ways to combine TV programming with Internet resources through the new set-tops. They all are trying to tie the content from the Internet as closely as possible to the program being displayed. In WorldGate's case, that means working with the programmers to link each segment of a show to a different Web page, with new pages linked as rapidly as every five seconds.

They also are coming up with ways to pull together local information, such

as entertainment calendars and restaurant reviews. "What we try to do is capture content that is immediately useful and offers a consumer a cut at their community that they might otherwise have to go to multiple sites to find," @Home's Grosser says.

A related use of the advanced boxes is to tune in broadcasts of data, either popular Web pages or traffic updates. The first data services, Morse predicts, will focus on giving people the kind of information they want to have as they walk out their door in the morning, such as weather, news and sports. Although the same information is sent to all view-

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ers, each set-top could be programmed to display only the information desired by that customer.

Several European cable operators already are venturing down that path, says Jon C. Haass of OpenTV, another Silicon Valley software company working in the field. These companies, Haass says, are using digital technology to create dozens of virtual channels that deliver such personalized services as interactive forecasts, ticketing, banking, travel reservations, horoscopes and games.

The next step is to combine the data broadcasts with TV programming. "Integrating data feeds with broadcast entertainment will change the way people feel about TV, in a good way," Grosser says. The point is to give viewers more to explore within a channel, rather than clicking to another network. One of the ideas being explored by @Home is to use video streaming technology to allow viewers to tune in two programs at once. "We're really just scratching the surface," Grosser says.

Closing the sale

The idea of adding data streams to TV programming fits well into what advertisers want to do, which is to send different messages to different audiences based on what they're likely to buy. For example, Morse says, the technology could be used to tout beer to one set of viewers and furniture to another.

Interactivity may be an even greater boon to advertisers. By inviting viewers to click on the screen for more information about a product or service, advertisers can identify not only the demographic groups that respond most strongly to a pitch but also the individual consumers.

"If people see an ad they can respond to it immediately. And demographic information can be captured to help identify how successful the ads are, which groups or what it's capturing," Schleyer says. "It's becoming a very different way of reaching the consumer."

Those kinds of leads are far more valuable to advertisers than a simple Nielsen rating—and so cable operators can charge more for them, Krisbergh says. In fact, a French cable TV company discovered last year that thousands of viewers were willing to pay to see an interactive advertisement

unveiling a new model of Renault, Haass says. "Renault said, 'Great, we'd like to run this all the time.'" But the cable operator demurred, Haass says, because it hadn't figured out how much to charge the automaker for the spot.

Ron Whittier, a senior vice president for Intel, argues that interactive set-tops let advertisers go one major step further: They can actually sell products. Intel is working with the Public Broadcasting Service on digital TV programs that will be enhanced with data, including ways for viewers who tune in on their PCs to buy PBS gear with the click of a mouse.

Tele-Communications Inc. Chairman John Malone has a similar vision for TCI's advanced set-tops. The cable operator may work with broadcasters to charge premium rates for the exclusive right to run interactive ads during major events, Malone suggested at a briefing for analysts last month.

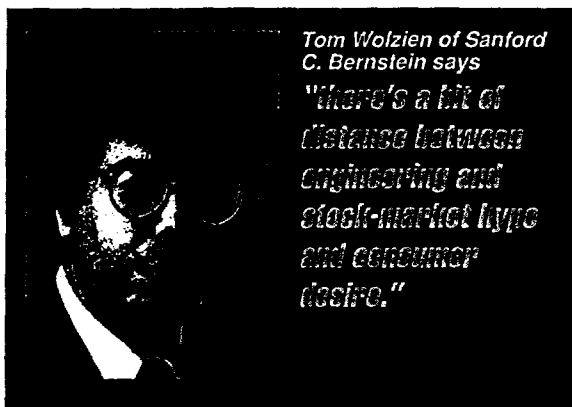
TCI also is trying to subsidize the boxes by selling companies preferred access to TCI's subscribers. For example, last month it announced a tentative deal with Bank of America and Intuit to offer banking and other personal finance services through the advanced set-top. Bank of America reportedly is paying \$50 per box deployed for the privilege of helping TCI decide which banks and financial services companies will offer service to customers as part of a basic digital package.

Leo Hindery, TCI's president, told analysts last month that TCI expects the subsidies from other companies to push the effective cost of the box down to \$150, or half the original price TCI that negotiated with General Instrument. The goal is to have the price as low as the cost of the current analog box, enabling TCI to put one in every subscriber's home. "It's really getting into more of a razors-and-blades scenario more quickly than people imagined," says Jill Frankel, an analyst at International Data Corp.

Having broad deployment is important if TCI hopes to induce specialized programming and services for the set-tops. For example, Morse says, advertisers are interested in the possibilities presented by the new boxes, but their first concern invariably is how many viewers can be reached that way. And no one can hide the fact that it will take years for the boxes to reach a sizable percentage of homes.

Looking further out

Although they will be able to decode digital cable signals, the advanced boxes will need some extra equipment to handle digital broadcasts from the local TV stations. Those broadcasts are slated to begin in the 10 largest U.S. markets by November. At the very least, says Jerry Bennington, a senior vice president at CableLabs, the boxes will pass the digital broadcasts on to digital TVs without alteration. Still to be decided is whether they also will decode the digital signals so that they can be shown on conventional sets, as the broadcasters would like. Such an approach could require an additional or more powerful microprocessor as well as more memory, raising the cost of the box.



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"there's a bit of distance between engineering and stock-market hype and consumer desire."

Then there are a number of technical issues that have to be addressed, such as how to display an onscreen guide on a digital TV. "These are all solvable problems," Bennington says, adding, "It's going to take awhile for all this stuff to be smoothly integrated."

A more intriguing possibility to cable operators in the long term is telephone service via the set-top's high-speed modem or similar device, using a data transmission technique known as Internet Protocol. IP telephony costs much less to get up and running than more conventional forms of digital phone service over cable, which are saddled with significant equipment costs. The IP approach also makes possible multimedia communications, such as video telephony.

The flip side is that the technology still is in its early stages, with real problems to be overcome before IP telephony is as reliable as a phone line. Although he is a vigorous booster of the technology, Mark A. Coblitz, vice president for strategic planning at

Comcast, says that it will be at least two years before IP-enabled cable networks became a reality.

Sony also sees the advanced set-tops as the central point in home networks, distributing information to computers, televisions and other consumer electronics. The company has been working with other manufacturers and Microsoft to make home electronics interconnect and interoperate, says Mack Araki, a spokesman for the company.

The core business

The limiting factors for many of the new services are not just the technology or the cost. It's also the ability of the cable companies to answer customers' questions and solve the problems they encounter. "Cable operators don't have a lot of support personnel who understand this stuff," says PowerTV's Morse. "So the ability of a cable operator to launch these services is gated by their ability in supporting it. ... They have customer-support people who understand snow, not computer crashes."

Another issue is how well the cable company is delivering its main service, television. Back in 1992, the industry's steep price increases and frequently poor service led Congress to reregulate cable. Prodded by their trade association and local officials, many operators have tried to improve their performance, but consumer advocates continue to rail against the annual price hikes. "Cable operators over the last two or three years have recognized that their service reputation is their biggest impediment to selling these new, enhanced services," as well as their biggest competitive risk, says Donaldson Lufkin and Jenrette's Buck. The cable companies' performance has improved, while the local phone companies have slipped, Buck says, diminishing the perceived gap in performance between the two wires into the home.

Still, Jones Intercable's O'Brien says, cable companies need to be cautious about the new services and how they reflect on the industry's lifeblood: "Everything we do has to emanate off our core business. ... If we ain't doing a good job of doing what we're doing, nobody's going to try us."

Jon Healey is a telecom reporter for the San Jose (Calif.) 'Mercury News.'

Digital Television

**Before the
COMMITTEE OF COMMERCE
SUBCOMMITTEE ON TELECOMMUNICATIONS,
TRADE, AND CONSUMER PROTECTION
Hearing on Digital High Definition Television: Coming
Soon to A Home Theater Near You
April 23, 1998**

**STATEMENT of GARY SHAPIRO
President
EIA's Consumer Electronics Manufacturers Association**

Thank you Chairman Tauzin and members of the Subcommittee.

The Consumer Electronics Manufacturers Association, a sector of the Electronic Industries Alliance, is the trade association representing the consumer electronics industry. The consumer electronics industry provides the American public with televisions, personal computers, digital versatile disk players, VCRs, and the accessories that connect and enhance these products. Our 450 members include all of the country's major consumer electronics manufacturers, and many smaller companies that design, produce, distribute and sell electronics products.

CEMA and its members have worked over a decade to launch HDTV. With the broadcasters, CEMA co-founded WHDTV, the Model HDTV Station which transmits a HDTV signal 24 hours a day locally. We were also a major funder and proponent of the Advanced Television Test Center and have been active in the Advanced Television Systems Committee, and the myriad of committees on Dick Wiley's FCC Advisory Committee on Advanced Television Services. We are not a "Johnny-Come-Lately" to HDTV. Indeed, CEMA members invented digital television here in the United States and our industry has already invested almost a billion dollars in digital television.

Congress, the Federal Communications Commission, and American industry have been working together for more than a decade to prepare for digital television, especially high definition television or "HDTV." Thanks to the leadership of Congress and the Commission, most of the difficult work has already been done: spectrum has been allocated, a broadcast transmission standard has been issued, channels have been assigned, and service rules have been established. As a result, we stand on the threshold of a new era in which Americans will be presented with a number of extraordinary new digital television services.

Perhaps the most eagerly awaited of these new services is HDTV. HDTV represents the highest quality video resolution, which CEMA formally defined last January as comprising the "720 Progressive" and "1080 Interlaced" broadcast formats.

With either format, HDTV is stunning. When viewers see it, eyes pop and jaws drop. It combines remarkable picture resolution with a rectangular widescreen and tremendous digital surround sound. The big three networks have committed to presenting programming in HDTV, with one network selecting the 720 Progressive format, and two others the 1080 Interlace.

You saw HDTV demonstrated today. I hope you will agree that HDTV will find an enthusiastic home in the American living room. I am convinced that the big HDTV experience-with its remarkable improvement over current television-will draw consumers to the stores to begin the digital television transition. We congratulate the broadcast networks for their decision to offer HDTV to American viewers.

The networks have also said that they will be presenting some programming in standard definition television, or "SDTV." This lower quality resolution, which our industry has defined as the 480 Interlaced or Progressive broadcast formats, will allow networks to deliver viewers different combinations of programming and data.

Lately, much ink has been spilled over the broadcasters' choice of digital television formats. This is less controversial, and perhaps less important, than one would think. Some have expressed concerns that broadcasters use of differing formats may somehow delay the introduction of digital television. I am happy to report that these fears are misplaced and the news reports are mistaken. We do not have a Beta versus VHS situation. Consumers will not be paralyzed. Manufacturers will not sell products which don't work.

Digital television receivers will be for sale this Fall, and these receivers will be able to receive any and all of the formats chosen by the broadcasters.

It is important not to become overly focused on these individual format choices. Digital television is a lot like ice cream: all ice cream is good... and premium, high quality ice cream is the best. In the same way, all digital television will be a huge improvement over today's analog TV. And the highest resolution formats, HDTV, are spectacular.

We believe that some 40 million Americans are likely to be early adopters of HDTV. Right now, over 18 million Americans own a television receiver for which they paid at least \$2,000 retail. By the time HDTV hits the market, more than 50 percent of these "high-price" sets will be at least three or four years old and the owners will be thinking about replacement. We believe that this built-in market will look to replace their sets with HDTV or some sort of digital system. Every Sunday afternoon and Monday night during the football season, millions of Americans settle back in front of a large screen TV to watch the game of the week. Soon, many of these fans will be watching the game in full, glorious high definition.

Recently, home satellite provider DirectTV announced that it would

begin carrying HDTV. This is significant step in the commercial availability of HDTV because of DirectTV's national coverage. Soon consumers will be able to access digital television-and salesmen demonstrate it in their stores-anywhere in the country.

Congress has set a firm timeline for the transition to digital television. In the Balanced Budget Act of 1997, Congress required that all broadcasters turn off their analog transmitters by 2006, and return their analog spectrum to the government for auction. It is estimated that this spectrum will bring as much as 15 billion dollars to the US treasury. The return of this spectrum by 2006 is premised on a swift and successful transition from analog to digital broadcasting.

However, a successful transition will only occur if these wonderful new television services are available to all Americans, including cable viewers. That is why it is absolutely essential that you instruct the FCC to require that cable companies carry the broadcasters' full digital television signals, including HDTV.

Without a guarantee that cable companies will carry digital signals, the race to digital will be slowed. Two-thirds of American homes currently rely on cable for their television service. Broadcasters will move quickly to begin digital service if they are certain these broadcasts will reach these cable homes. And consumers will purchase new digital television receivers if they are certain these receivers will work with their cable systems. Broadcasters and consumers will be more eager to move if they know that cable will fully participate.

Uncertainty over cable carriage could impede the entire transition to digital. At the very least, uncertainty will maximize and prolong transition costs for both industry and consumers. Instead of a clean and swift jump to digital broadcasting, we would then find ourselves in digital-analog limbo-one foot in each camp, unable to move forward or backward. And Congress' target of 2006 would be indefinitely-perhaps infinitely-- delayed.

But this is not just about ensuring a swift and successful transition. It is also a matter of fundamental fairness to the American television viewer. Chairman Tauzin identified the critical issue in his September 1997 testimony before the Senate Commerce Committee, when he said "In my opinion, when Americans see HDTV-with its breathtaking pictures and extraordinary sound-they will want it...even demand it. But how will they make that decision if they have never seen or heard it?"

By virtue of their position, local monopoly cable companies are the "gatekeepers" for the video services coming into the home, with the ability to determine which video services consumers do or do not see. Broadcaster investment in digital transmission equipment and consumer investment in new digital television sets mean nothing if the local cable operator refuses to pass the digital signals through. Local cable operators should not be allowed to exploit their bottleneck position by degrading HDTV signals to a lower resolution, or by not carrying digital signals at all.

This is not only good public policy-it's the law. The must-carry rules enacted as part of the 1992 Act require that cable companies carry the

signals of local broadcast television stations. In the digital environment, this means that cable companies are required to provide their viewers with the entire six megahertz digital channels used by broadcasters, delivering all of the broadcasters' digital information intact. The solid and well-considered principles that drove the original must-carry legislation have become even more important in the digital age.

The must-carry law also requires that cable companies pass through broadcast signals with no "material degradation." This means that cable companies must be required to pass through broadcasters HDTV signals as nothing less than full HDTV. Some cable interests, however, have unilaterally decided that "standard definition is good enough". They have already said that, rather than passing through broadcasters' full HDTV signals, they intend to dilute or "dumb down" HDTV broadcasts and provide them to their subscribers only in the lower resolution formats.

For these cable operators, the conversion of HDTV formats into standard definition allows them to send more programming channels to the home, at the expense of higher audio and video quality. This would be the same-or worse-than a cable company taking a network broadcast like the Super Bowl and delivering it to its viewers with a black and white picture and mono sound.

If cable companies are allowed to dilute HDTV signals, the result will likely be a widespread consumer backlash against cable companies as consumers shift to DBS and over-the-air antennas.

Consumers will not be fooled, because they can clearly tell the difference between standard definition and high definition television. In recent side-by-side comparisons, consumers surveyed by an independent market research firm overwhelmingly indicated their preference for HDTV over lower resolution pictures.

And little wonder: at its best, HDTV delivers from one to two million picture elements, and video quality that is far superior to the 300,000 picture elements offered by standard definition television.

Fortunately, no insurmountable technical or other impediments prohibit cable companies from passing through digital television signals. In fact, many approaches will allow cable companies to pass digital signals to the consumer, from basic cable networks in rural areas to more advanced urban systems.

Instead, the decision of a few cable companies to avoid carrying digital television stems solely from their reluctance to allocate capacity to local broadcasters that could otherwise be used for more revenue-generating channels.

In 1992, Congress rejected this anti-consumer argument and decided that the public interest requires that cable allocate space to local broadcasting. With the imminent introduction of revolutionary new digital services, Congress' public interest reasoning remains more valid than ever, especially given the recent explosion in cable channel capacity. From 1995 to 1998 alone, the channel capacity of the average cable system has nearly doubled-and capacity is expected to double again by 2004.

Beginning this Fall, manufacturers intend to begin to offer a DTV product line which, eventually, will be as diverse as the current product lines for today's analog televisions. While the introductory prices of the very first HDTV's will be high, they will be no higher than the prices for the first black and white or the first color receivers, adjusted for current dollars.

As usual in the consumer electronics industry, these initial prices should fall steeply. For example, over the past seven years, the price of a 35" or 36" direct view television receiver has dropped nearly 60 percent. And over the past four years, an even more dramatic drop has occurred in the retail price of home satellite systems.

The combination of economies of scale, rising production efficiencies and the vigorous competition and innovation that characterize our industry will ensure that digital television quickly becomes affordable to the vast majority of Americans. Meanwhile our industry will develop and market diverse product offerings that appeal to the widest possible spectrum of consumers.

I am convinced that digital television will be a massive success-but only if all American viewers, including cable viewers, are allowed to see it. If cable is not required to carry broadcasters' full digital television signals, including HDTV, the transition to digital cannot succeed as quickly. I ask you to ensure that the free market, not cable gatekeepers, determine which digital television and HDTV products Americans choose to buy and enjoy.

Thank You.

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Malone: Sculpting TCI's future

Digital everything

BY DIANE MERMIGAS

FINANCIAL EDITOR

DENVER—After building, radically restructuring and securing control of TCI's \$55 billion empire, Chairman and CEO John Malone is fixed on the digital expansion of TCI's influence and fortunes.

The task of inventing new revenue streams, hinged on integrating the TV and PC, is reminiscent of cable's early struggles, says the 57-year-old technical whiz and consummate negotiator.

"We can't dictate. But we can influence. It's always been all about trying to find ways to have power to influence our future," Mr. Malone told **ELECTRONIC MEDIA** in a rare interview. "There's no question there's a schizophrenia on this subject that we all have."

Mr. Malone is positioning TCI as the ultimate gatekeeper, playing both ally and adversary to the world's most formidable cable, broadcast, computer and program players.

He is sternly limiting Microsoft's and other computer companies' participation in the advanced set-top digital boxes being rolled out next year. He is extending an olive branch to broadcasters: an affordable, even profitable, way to multiplex local content. He is offering broadcast networks a means to reverse their audi-

(Continued on Page 36)

Malone positioning TCI as gatekeeper

(Continued from Page 1)
ence erosion and pay digital conversion bills.

"Basic cable could become the dominant platform. Analog channels will lose their penetration as everything goes digital, and we'll see the broadcast networks petition us to carry them," Mr. Malone said.

"If you are a single network in a 164-channel world, you are going to lose market share. The advertising revenues are going to be under pressure. Unless you have more than one channel, your economics will deteriorate," he said. "There will be an interesting shift of power."

The digital conversion

But it could be that Mr. Malone's riskiest maneuvering lies ahead.

Computer moguls Paul Allen, who is buying Marcus Cable, and Microsoft Chairman Bill Gates have the financial and technological clout to shape the digital playing field to their advantage and work around TCI.

Broadcasters, who are destined to become multilevel, pay-per-view programmers in their own right, could remain divided on technical high-definition television standards. That would be costly for TCI's new boxes to accommodate, which is why TCI is pushing hard for a compromise 720-interlace standard.

In fact, TCI could prove to be its own worst enemy if it fails to execute its ambitious digital plans on schedule and bruises its balance sheet.

"The transition from analog to digital will be the most important and exciting thing the cable industry has experienced, and it will be a tremendous value for those who do it properly," Mr. Malone said.

"We've been caught before in a technology deployment bind. It won't happen here. There is not a lot of invention in these advanced set-top boxes. It's more of a marriage of existing components," he said.

"Now, it's just getting various software companies working together to create something we can all benefit from."

Cable's new economics

TCI is promising 90 percent digital subscriber support in five years, although only 59 percent of its homes will have high-end system upgrades by the year 2000. The raw cost of manufacturing advanced set-top digital boxes could exceed \$2 billion, based on TCI's soon to be streamlined 10.5 million subscriber base and reduced cost of \$260 per box.

Aiming for 15 percent digital penetration by year's end using a million existing set-top boxes, TCI already has signed 180,000 digital customers.

In classic TCI fashion, the company is crafting strategic service and software partnerships that will pay for the boxes with hefty upfront fees and shared back-end revenues.

The first such deal is an estimated \$1 billion personal finance platform pairing Bank of America, Intuit and @Home. Similar arrangements with Amazon.com, and Barry Diller's Home Shopping Network and Ticketmaster are also expected.

A sweeping \$1 billion telephone and high-speed Internet alliance in the works with AT&T also will subsidize digital boxes and services.

Still, these new cable economics are plagued by many unknowns such as the collective impact of system upgrades, program development, customer service and digital marketing.

Free cash flow that soared to \$913 million in 1997 (pumped up by intense cost cuts and a pullback on costly upgrades) will drop to about \$200 million this year as TCI launches a \$1.8 billion, three-year capital spending program.

With first quarter operating cash flow flat, analysts say 1998 cash flow, earnings and revenues will strain to grow 8 percent to 10 percent.

Pledging to hold subscriber rate increases to below 5 percent and reduce its \$14 billion debt to \$9 billion, TCI must do more than shift digital set-top costs off balance sheet to TCI Ventures.

Some analysts believe TCI could find itself in a temporary financial bind this year and

next on the way to digital prosperity.

Mr. Malone downplays that, saying, "The only risks to TCI are attitudinal and physical. We've got the rest figured out."

Lining up constituents

Mr. Malone says fortunes will be made unleashing the firepower of the new digital spectrum.

"The most important set of deals we can make are alliances with advertisers and retailers" because they will subsidize the digital rollout, he said.

The point-and-click interactivity will lend itself to "impulse upgrades" of cable services, "impulse buying of prod-

ucts" and instant consumer feedback "that will forever change the face of TV advertising," he said.

"I love anything that's done on impulse," Mr. Malone says. "It has great economic implications."

The electronic mail service that @Home will provide to TCI's advanced digital set-top box users will carry advertising that will be very profitable.

This summer, Mr. Malone and TCI President and Chief Operating Officer Leo Hindery Jr. will seek to form a consortium of top 10 advertisers willing to make long-term digital cable commitments.

An industrywide 15 million advanced set-top box order placed with General Instrument Corp. last year demonstrated the cable industry's determination to go digital. But only TCI walked away from the deal with nearly a 10 percent stake in General Instrument, allowing it to share in the value being created.

"\$700 million worth of GI shares and warrants is a nice offset to any cost of the boxes,"

Mr. Malone said.

However, analyst Tom Wolzien of Bernstein & Co. says TCI's digital plans could be most affected by subscribers.

"The biggest question haunting TCI is whether customers really want it," Mr. Wolzien says. "TCI is providing early optimistic forecasts, but it won't really know for sure until it has assumed the execution risk."

Content is key

Mr. Malone says content and services will be key to making digital a profitable "must-have" for consumers.

The easiest, most affordable answer to content lies in the

\$13 billion in program stakes in Liberty's portfolio.

Discovery, BBC, Encore and other Liberty film libraries will be tapped to create endless niche "mood on demand" program services with demographically targeted advertising, cross-promotion and merchandising.

Discovery is working on six of Liberty's 18 planned digital channels, each representing a \$3 million to \$6 million investment, compared with an average \$36 million to develop a new analog channel.

"All the money we spent investing in program services is paying off now," Mr. Malone said. "We can maximize our existing libraries for pennies. All the returns will stay in the family. This will yield some very powerful margins."

Also, the ability to publicly spin off many of Liberty's components—including Fox/Liberty Sports, Discovery and Encore—gives TCI more program generating leverage.

Mr. Malone concedes that existing program contracts may be an obstacle to filling content

needs for its 21 million owned and affiliated subscribers.

"Most of our contracts with programmers give us the right to go digital. So we might take everything digital in selected markets," he said.

Digital also offers TCI a new defense against escalating program prices.

"If a programmer gets out of control, it's easy to sidestep him and make it an optional rather than a mandatory service.

"The only program costs really out of control are sports, and you really can't blame the sports channels. It's basically an issue of competition for one-of-a-kind sports rights being bid up by a handful of suitors.

It's the only truly unique programming left," Mr. Malone said.

He says he is prepared to throw TCI's full distribution support and perhaps even an equity stake behind a new football league that could be formed by Time Warner's Turner Broadcasting and NBC later this year.

"We're not thrilled with the way the NFL has treated the cable industry. To give an exclusive to DirecTV for the football package is not very cable friendly," he said.

Broadcasting: Friend or foe?

Mr. Malone views local broadcasting as a competitive edge he wants to protect.

"To the degree broadcasters invest to produce for digital, it gives us all an edge against satellite," he said.

TCI has intensified talks with broadcasters begun last spring. Under one scenario, TCI could pick up a local broadcaster's feed, time shift it, multiplex it, repackage and retransmit it in any standard to subscribers for a fee, the proceeds of which TCI will split with broadcasters.

Broadcasters can pay TCI and other cable operators to transmit their HDTV program signals, treating it as "a subscription business."

TCI wants to head off broadcasters who want their own PPV platforms.

"Sure, we're pushing for technology to multiplex high-definition signals so we can make better use of our real estate," he said.

"But, at the end of the day, when they see their networks are run by guys like Michael Eisner who has got a hell of a lot more money in his cable networks than in his broadcast network, can they do any worse?" Mr. Malone said.

Still, TCI and broadcasters are destined to clash over digital must-carry, an issue that could have significant financial ramifications for both sides.

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"There are 1,600 broadcasters and 164 cable channels. We don't expect it. We don't agree with it," Mr. Malone said.

"We're all trying to find an answer that works for all of us. We'd like to accommodate the computer industry. We'd like to accommodate the consumer electronics industry. And we'd like to do it in a way that does not damage the local broadcasters. But it's got to work for consumers."

Mr. Malone is convinced the digital boxes due out in early 1999 will be "a partial solution" for all concerned.

"If the high-definition TV sets are so expensive that very few people buy them, none of us can afford to produce or promote digital programs. That's the way a market economy works, no matter what the government says."

Mr. Malone has been testing three digital units in his own home with a "watch and surf" function like the WebTV technology that will be integrated

into the advanced set-top boxes.

"The service is quite addictive. It ends the dispute over who gets the remote control because you can use it without

Making merry with Microsoft

Mr. Malone concedes that it has taken longer than expected to negotiate a detailed operating system agreement with Microsoft for the digital boxes and to negotiate a telephony-high-speed data partnership with AT&T. But, he feels certain both will happen "because they need us."

The layered approach to open cable set-top box vendors gives TCI and all cable operators independence from "the camel's nose-under-the-tent mentality for which the software industry is famous," Mr. Malone said.

But the ongoing struggle with Microsoft has less to do with a culture clash and more to do with the need to expand the box's memory capacity in order to accommodate the Windows operating system, Sun Microsystems's Java language program and Sony's smaller real-time operating system.

"It's really a question of whether these four companies can cooperate," Mr. Malone said.

Microsoft will receive a license fee of only about \$60 million for its Windows CE and WebTV technology but will access revenues from endless cable connections.

"We're not up at the plate looking to bunt here. We're looking to hit a home run because we want it all. We don't want to pick one at the exclusion of the other. That's what makes this hard."

Lots of leveraging

The core of Mr. Malone's real power lies in the financial engineering that gives TCI uncommon flexibility to expand into every corner of the digital frontier at low cost and high upside.

Mr. Malone leverages TCI assets and stakes to create value through joint ventures, public spinoffs, clusterings and outright acquisitions. His Liberty Media and TCI Ventures are independent, high-yield deal-driven investment portfolios and direct beneficiaries of TCI Group's digital conversion.

Analysts speculate Mr. Malone could eventually sell all or part of TCI—a notion that draws only a smile from the man regulators call cable's "Darth Vader" because of his strong-arm negotiating tactics.

TCI's potentially lucrative options are impressive.

TCI owns 42 percent of \$6.2 billion in newly joint ventured cable systems—carrying \$5 billion in TCI debt and 5 million TCI subscribers—that could be sold or spun off.

Other future tracking stocks could include Sprint PCS, Fox/Liberty Sports and HTTS, TCI's Headend in the Sky operations that is a one-of-a-kind clearinghouse for digital production, transmission and compression.

TCI Ventures, a publicly traded \$7 billion, debt-free investment umbrella formed six months ago, can continue as a greenhouse for start-ups without posing a financial risk to TCI Group, the company's cable systems.

TCI Ventures will form what is likely to be an instantly profitable broad-based leasing arm for its advanced set-top boxes with only 10 percent equity.

TCI will likely tap as deal currency its own stock, which has more than doubled in value the past year to \$31 per share. It could also use the \$16.5 billion in stock of other companies (such as Cablevision Systems) that it holds.

Although short of its \$37.38 per share high in 1972, analysts expect TCI stock to rise another 30 percent in the next year.

"This company is substantially undervalued," says Mr. Malone, who owns a \$1.5 billion stake and has 45 percent voting control of TCI. "No one is more risk-adverse than TCI's controlling shareholder. That's why the risks I take are sure ones."#

Sorting out the Digital TV Mess

April 8, 1998

"Sorting out the Digital TV Mess," by Jim Davis Staff Writer, CNET NEWS.COM April 8, 1998, 1:00 p.m. PT news analysis

LAS VEGAS--A litany of disjointed announcements is generating a cacophonous buzz around the impending appearance of digital TV and the hardware needed to view it at the National Association of Broadcasters convention here this week. As a result, sorting out what this means to the future of the PC and TV is a challenge in its own right.

The upshot is that the broad array of technology initiatives being generated by a diverse group of companies from different industries with different agendas has complicated the arrival of the digital era to television, to say the least. Nonetheless, in spite of the confusing issues surrounding its deployment, consumers who see high definition digital TV have been enthralled by the technology.

Alan McCollough, president and chief operating officer of the national electronics retail chain Circuit City, said at a panel discussion today that the nation's first broadcast of a baseball game in high definition display formats generated large crowds and an unexpectedly high level of interest.

Users will be able to receive a combination of high quality video and audio that isn't possible with today's analog TVs or most personal computers. But that isn't the only selling point of the digital TV era. Broadcasters may also focus on broadcasting local content such as a dedicated traffic channel or other special interest programming with the extra channel capacity that's offered with digital television, according to a report from Maryland-based Arlen Communications.

Computer-like interactivity will also be major enticement. The high-quality picture can be combined with data for interactive services like shopping and programs-cum-data-content that can be served through new digital TVs, PCs, and other computer-based information appliances. Early examples of these combined services already exist in the form of devices such as Microsoft's WebTV--without the high definition programming from broadcasters. On the PC side, Microsoft and Intel are also gearing up to make TV viewing a standard feature on PCs with the coming release of Microsoft's Windows 98 operating system. Apple Computer is also reportedly working on a device for interactive TV.

Even as the deadline for the transmission of digital transmission looms, though, many questions for consumers remain unanswered.

The public will have a variety of devices from which to view new digital programming, and broadcasters will be sending content in a variety of formats at a variety of quality levels. But before they can decide on what devices to buy, consumers must live in the right part of the country--either that or purchase service from a direct broadcast satellite (DBS) provider that will provide high-definition programming.

Initially, major affiliates of networks such as ABC and NBC will have to transmit digital signals in the ten largest markets by May 1, 1999. Analysts say this represents a potential market of 50 million out of the total 100 million television viewers. Smaller markets will need to be online with digital TV by November of 1999, with all remaining commercial stations converted by the year 2002.

In these areas, consumers will have the option of buying new digital televisions, most of which will cost in the \$3,000-to-\$5,000 range initially. By virtue of the price of new sets, digital TVs aren't likely to be sold in high volumes at first. Still, industry observers think there is already a significant demand for the new devices.

"A lot a manufacturers will rush to be first," said Gary Shapiro, president of the Consumer Electronics Manufacturing Association. "Retailers have so many [preliminary] orders, manufacturers are rushing," he noted. Companies such as Panasonic and Sony have previously said they expect to have systems available sometime this fall, though that date could slip if there is not enough digital TV programming at that time.

This was a serious problem that Japan faced when domestic manufacturers first started to sell high-definition TVs in the latter half of the 1980s: the products were available but there was almost no programming in Japan.

The other obstacle is pricing but this should resolve itself relatively quickly. Shapiro predicts that a mass market for new high-definition TV sets priced between \$300 and \$400 will arrive after the turn of the century.

An interesting twist on the emergence of this new market is that, in addition to the expected crowd of consumer electronic giants, computer companies such as Microsoft, Intel, and Compaq Computer are also competing fiercely to drive the market and potential buyers toward their vision.

In fact, consumer electronics manufacturers may be beaten to the punch by PC companies, especially if the computer industry can manufacture lower-cost receivers. Cutting-edge PC users--via plug-in circuit boards--and some manufacturers will be adding digital television features to their PCs before the end of the year.

Intel, for instance, is working with Zenith on digital TV receiver cards that would plug in to an open slot on a PC and receive any digital TV transmission. Multiple cards for each format are now needed, each of which cost around \$500--a situation that doesn't lend itself well to the mass market.

"That's well beyond the price point needed for volume deployment," said Ron Whittier, senior vice president with Intel's content group in a presentation here this week. He said that the cards should cost around \$200 to \$300 once volume production is reached but did not say when that might occur.

Still, the potential still exists for PCs to be the first volume platform for digital television, a matter that may influence the use of computer-friendly digital TV formats.

Cable companies, of course, will also participate. Companies such as Telecommunications Incorporated and Time Warner Cable are working on set-top boxes capable of providing interactive services as well as high-definition TV. Some markets will have these devices available by midyear, with wider availability expected in 1999. However, it is unclear whether signals from broadcasters will get passed through to the cable networks.

For digital television to be successful, cable companies must pass through the digital signal in whatever format the broadcasters send it in, Circuit City's McCoullough said. "Otherwise, people will have to go back on their roofs to install antennas," he said.

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Box milestone

General Instrument Corp. says it has shipped its millionth DCT-1000 digital set-top box. But even as that announcement comes, large cable operators such as Tele-Communications Inc. are moving to a more powerful version of the box, the DCT-1200. GI also says that it has equipped more than 500 cable head-ends that pass some 25 million homes in North America with digital systems capable of delivering MPEG-2 digital video, video-on-demand, Internet access, interactive programming guides and other products and services.

April 6 1998 **Broadcasting & Cable**

Will cable be ready for HDTV?

By Price Colman

There's been considerable debate recently regarding cable and HDTV. That debate has focused on four key questions:

- Can current-generation analog and digital set-top boxes pass through HDTV signals?

- Will advanced digital set-top boxes be able to pass through HDTV?

- Will set-tops be able to convert all HDTV signals to analog NTSC signals?

- Is cable legally required to deliver HDTV signals?

First, current set-tops don't pass through HDTV signals, because HDTV was in the early developmental stages when those boxes were ordered.

Advanced digital set-tops will be able to pass through HDTV, even though there's no legal requirement for cable to do that. General Instrument's DCT-1000 box, of which Tele-Communications Inc. has ordered about a million, doesn't have HDTV signal pass-through capability. But TCI intends to move quickly to the DCT-5000, which will be able to pass through HDTV signals. But even then, HDTV pass-through capa-



Time Warner has asked Scientific-Atlanta to retrofit the Explorer 2000 set-top box to pass through HDTV signals.

bility may be more an option than a standard feature.

As for whether advanced set-tops will be able to convert HDTV signals to analog NTSC, the answer, for now, is no. The cable industry's rationale is that the processing power required to convert 720 P-or-better HDTV signals is too costly and would hamstring the industry's ability to roll out advanced set-tops.

There are a couple of other important issues involving set-tops' HDTV capability: copyright protection and the interface with the TV.

The copyright protection issue appears to have been resolved as a result of recent efforts by the Copyright

Protection Technical Working Group, which includes Hitachi, Intel, Matsushita Electric Corp. of America, Sony Electronics Corp. and Toshiba.

The working group agreed in principle that the copyright protection would prohibit or limit copying of movies in the digital format. That agreement is crucial to establishing a standard inter-

face between set-tops and TVs or other digital appliances because the interface has to work with the hardware and software that enable copyright protection.

For now, the interface of choice is the 1394 IEEE—or I-Link—interface (also called firewire). For the time being it will be an optional fea-

ture because of cost.

It's unclear how much additional cost that 1394 interface will add—\$10-\$15 perhaps—but cable operators want to ensure that only those who really want the interface—namely, people with HDTV sets—pay for it. The 1394 interface also would be used as the set-top connection for other digital devices in the home, such as sound systems and DVD (digital versatile disk) players.

It's worth noting that while the 1394 interface has emerged as the leading candidate for that interface, maybe even the de facto standard, it's not the official standard—at least not yet. ■

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already available to accommodate the service. The commission also launches inquiry seeking broadcasters' comments on HDTV allocation schemes.

1989

January—The Defense Department agrees to grant up to \$30 million to companies developing HDTV screens and video display processors. The

funds will not be limited to American-owned researchers. Company proposals due Feb. 13.

July—House Defense Appropriations Subcommittee approves \$50 million appropriation for 1990 to Defense Advanced Research Projects Agency for HDTV research.

1990

March—FCC Chairman Alfred Sikes tells the blue-

FCC chairman Alfred Sikes makes announcement.
ribbon committee of the ATS advisory committee: "The commission's intent is to select a simulcast high-definition television standard that is compatible with

the current 6 mhz channelization but employing new design principles independent of NTSC technology."

June—General Instrument (GI) proposes all-digital



GI's Bob Rast and Woo Paik w HDTV test transmitter.

General Instrument Corp. says it has signed definitive agreements with 12 leading cable operators in North America to buy roughly 15 million GI interactive digital set-top terminals over the next three to five years in deals with a total value of \$4.5 billion. The signing follows GI's Dec. 17 announcement of initial agreements with the operators and lays to rest questions about whether GI would follow through on the preliminary deals with signed contracts. MSOs participating in the deal include TCI, Time Warner Cable, MediaOne, Comcast, Cox, Adelphia, Shaw Communications, Jones Intercable, Charter Communications, Lenfest Group, InterMedia Partners and Bresnan Communications. Combined, those operators have about 46 million subs. **61**

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February 23, 1998

TV Cable-Box Software May Blur Digital Signals

By JOEL BRINKLEY

For more than a year, Microsoft Corp. has been cajoling the nation's television broadcasters into abandoning high-definition television and using only the computer industry's favored, lower-resolution transmission formats when digital broadcasts begin in the fall.

At issue in this argument is how the digital cable boxes will handle the high-definition signals that broadcasters in the nation's 10 largest cities plan to put on the air starting in six or eight months.

American consumer."

By and large, broadcasters have rejected these entreaties. Now, however, Microsoft appears to have gained at least a small foothold for its proposal through a little-noticed feature of the company's agreement to supply the operating system for several million digital cable boxes being purchased by Tele-Communications Inc. And that has angered broadcasters, television set makers, government officials and others.

Gary Shapiro, head of the Consumer Electronics Manufacturers Association, complained during a broadcasters' convention last month: "TCI's 14 million customers may never have a chance to see **HDTV**. This is a huge tragedy for the

Leo Hindery Jr., president of Tele-Communications, replied that the association's "information is incorrect, and it was extremely irresponsible for them to mislead the public."

At issue in this argument is how the digital cable boxes will handle the high-definition signals that broadcasters in the nation's 10 largest cities plan to put on the air starting in six or eight months. Microsoft and its partners in the computer industry have been urging broadcasters to use only lower-resolution digital signals that are transmitted in the "progressive" format.

Microsoft and some other computer companies oppose full high-definition broadcasts because they do not want to pay for the extra memory and other components that would be needed to receive **HDTV** signals on personal computers. And they favor progressive transmissions because that format handles text and computer graphics with much greater clarity than the

competing "interlaced" format.

After the arrangement with TCI was announced, Craig Mundie, a senior vice president for Microsoft, said of Microsoft's proposal, code-named HD-0: "The cable industry now has a proxy in digital TV. The HD-0 formats are more relevant now than ever before."

The CBS television network and some other broadcasters have announced that they will broadcast the highest-resolution **HDTV** signals in the interlaced format, the one preferred by many people in the television industry. As a result, CBS denounced the Tele-Communications-Microsoft arrangement, which was announced last month. In addition, Sony Electronics Corp. and others including Susan Ness, a Federal Communications Commission member, and the National Association of Broadcasters have raised questions or complaints.

Tele-Communications' new digital cable boxes are intended primarily for use with conventional televisions, not the new digital models that will go on sale in the fall. The boxes will allow the company to offer dozens of additional channels by using digital compression to squeeze as many as 12 digital channels into the space occupied by one conventional analog channel.

In addition, when digital television broadcasts begin, Windows CE, the Microsoft operating system that is to be built into the boxes, will convert those programs for display on analog sets — but only if they are broadcast in the lower-resolution progressive format set out in the computer industry's proposal.

For the high-definition signals that CBS and other broadcasters plan to air, "the display would likely show white snow," a statement from Tele-Communications says. To accommodate those complex signals, the company says, additional memory and processing speed would have to be built into the boxes, raising the cost.

Related Article
The First High-Definition
TV Sets Debut
(January 12, 1998)

There is a second element to the debate. What will the boxes offer people who buy the expensive new high-definition television sets?

Tele-Communications says it is making provisions for them. "Our philosophy is that there aren't going to be many high-definition sets sold this year," said David Beddow, a senior vice president for Tele-Communications. "But for those people, our box will demodulate and de-encrypt the high-definition signal and pass it through to the **HDTV**." That means a consumer would have to run a second cable from the box to the digital input on the **HDTV** set.

But Shapiro said that solution was inadequate because he feared that Hollywood, ever concerned about the threat of piracy, would object to giving consumers access to de-encrypted digital, high-definition movies. "And I don't think they will consider this a minor problem," he said.

The issue is especially acute for cable movies. Once digital television broadcasts begin, the public will, of course, have unrestricted access to digital, high-definition movies that are broadcast over the air. But by the

time a movie appears on regular television, it is near the end of its profit-making life.

But that is not the case for pay-per-view movies or others that are carried on premium services like HBO, which has announced that it will transmit two channels of high-definition programming starting this summer. The digital cable boxes are still being designed, and the opportunity remains to respond to these complaints, though Tele-Communications has not announced any plans to do so.

Still, the company told Ness, the FCC commissioner, "At this point, the boxes are not configured to translate **HDTV** signals" in the full-resolution, interlaced format, "though that remains an alternative should the marketplace move in that direction."

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Lines drawn on HDTV

CEMA, TCI spar over delivery of high-definition signals

By Price Colman

The current furor over HDTV is like the cooking class from hell. Mix equal parts semantics, bureaucracy and economics; blend thoroughly, then pressure cook until too hot to handle.

After first claiming that Tele-Communications Inc. doesn't plan to pass through high-resolution HDTV signals (1080 lines, interlaced), the Consumer Electronics Manufacturers Association now contends that the problem is that TCI isn't prepared to convert HDTV signals into standard analog NTSC signals.

CEMA President Gary Shapiro says converting a 1080I signal to a standard

NTSC signal is "the nub of the issue I think the cable industry is going to have to carry 1080I," Shapiro adds. "Boxes are going to have to be built to carry the signal."

"I think they've shifted their position," counters David Beddow, senior vice president of TCI Technology Ventures.

CEMA first raised the issue at the NATPE convention in New Orleans last month, blasting TCI's apparent plans to water down HDTV signals as "a huge tragedy for the American consumer."

TCI President Leo Hindery fired the next shot in the press-release war, calling CEMA's assertions "false" and castigating the organization as

"extremely irresponsible" for misleading the public.

After the noise dies, the issue boils down to economics: TV set manufacturers' desire to sell \$7,000-plus HDTV sets and broadcasters' struggle to make money on delivering high-definition programming that's going to cost millions to produce.

So far, no one's talking about the pot of gold at the end of the rainbow. Instead, they're talking about how much red ink they're going to bleed in the process of delivering HDTV.

"There is confusion out there, no question about it," says one source in the broadcast sector.

It's worth noting that while the government is pushing HDTV, it isn't necessarily requiring it.

The spectrum given to broadcasters is for digital television, and broadcasters have the choice of whether to use it for HDTV or standard-definition TV (SDTV) or a combination. But set makers have a vested interest in HDTV because the sets are more expensive, translating into greater revenue for manufacturers. Moreover, the argument goes, SDTV isn't enough better than current analog NTSC to drive set sales.

The last thing manufacturers want to do is promise a revolutionary new technology that's at best only an evolutionary step. And with sales of standard NTSC sets slowing, set makers need sales of the new technology to revitalize their industry.

Adding to the turmoil, broadcasters have equivocated on their plans for the digital TV spectrum. ABC, for instance, first suggested it wasn't likely to offer HDTV, then backpedaled/clarified that position in the face of the possibility that Congress might require payment for the spectrum. More recently, CBS, ABC and NBC have committed to offering HDTV in at least some prime time slots. Fox is keeping its HDTV plans close to the vest.

Cable's role in the DTV game is crucial because about 65% of all U.S. tele-

vision households get cable. Thus, in order for set makers to drive penetration of HDTV sets, the cable industry has to step up and deliver HDTV.

That raises the issue of semantics as related to advanced cable set-tops. The National Association of Broadcasters and CEMA define HDTV one way. TCI, which represents a sizable chunk of the cable industry, is leaning toward a considerably looser definition.

The baseline for HDTV, say the NAB and CEMA, is a television signal delivered at a minimum of 720 lines of

resolution, with each line refreshed each second (progressive scan), to a wide-screen TV set with a 16:9 aspect ratio. (Current NTSC-standard sets are 4:3.)

Tele-Communications Inc. takes the position that 480P (480 lines, progressive scan) also qualifies as HDTV. Whether or not it was intended to, that's what got CEMA's dander up.

But Hindery says the 6.5 million-11.9 million General Instrument advanced set-tops that TCI has ordered will be able to "pass through" all HDTV signals, including the top-level 1080I. "In

45

no way is TCI planning to 'downconvert' any higher-format HDTV signal to a lower HDTV format," he says.

TCI's position is that it's icing the set-top cake by equipping the boxes to convert 480P signals into standard NTSC, thus allowing broadcasters to deliver new digital programming to consumers without requiring the purchase of expensive HDTV sets.

"There's no requirement to translate an HDTV signal into anything," says Beddow. "The ability to translate a 480P signal [at 30 frames a second] or a 720P signal [at 24 frames a second] into a standard NTSC signal happens to be a byproduct of the processing power that's there for a different purpose."

No one in the cable industry suggests that MSOs won't pass through HDTV signals.

"There are a lot of conversations and discussions going on with reference to various resolutions," says Beddow. "I don't think what CEMA did was particularly helpful to that process. I have the feeling they did what they did based on inaccurate information.

That's unfortunate."

While broadcasters and set manufacturers are facing economic uncertainties about HDTV, cable has its own set of challenges.

After considerable negotiations, the cable industry—led by TCI—structured a deal to order from GI 15 million advanced set-tops at a price of roughly \$4.5 billion. The average box cost over the three to five years of the contract is \$300. At that price, TCI and the other cable players involved in the deal figure that the economics work. But if you start adding the additional processing power and memory that would enable the set-top to convert a 1080I signal into standard NTSC, then the business model begins to collapse. That means slower penetration for digital cable and set-tops and ultimately slower penetration for DTV, whether SDTV or HDTV.

TCI is hardly alone in facing the HDTV issue. Time Warner, the nation's second-biggest MSO, is "committed to providing HDTV signals to customers who buy those sets as soon as possible after sets become available," says Time Warner spokesman Mike Luftman. The 550,000 Scientific-Atlanta Explorer 2000 boxes that Time Warner ordered didn't originally include specifications for passing through HDTV signals, Luftman says. But the MSO has asked S-A to retool the boxes and is confident they'll be ready for launch in the next six months.

How cable finally delivers HDTV could end up in the hands of the FCC, something no one—with the possible exception of CEMA—wants to see happen.

Regulators are gearing up for a rule-making on HDTV must carry. The result could determine whether current cable must-carry regulations, which require cable to provide signals equal in quality to broadcast, also apply to HDTV signals.

"I hope that it doesn't stop at the door of regulators," Beddow says. "I hope that the three industries involved here—consumer electronics, broadcasters and cable—can reconcile the issue and come to a solution." ■

February 9 1998 **Broadcasting & Cable**

S-A to ship 1 million set-tops

Scientific-Atlanta, saying it holds an 18-month technological lead over competitor General Instrument, will ship just under 1 million of its Explorer 2000 digital set-top boxes this year.

New deals with MediaOne, Cox, Adelphia and Marcus in the U.S. and with Rogers, Videotron and Cogeco in Canada add to S-A's existing deals with Time Warner and Comcast.

"Our deliveries are a full year and a half ahead of other announcements you've seen in the press," says James McDonald, president of S-A. "We are clearly the industry leader in this area."

One piece that's missing, one which S-A is pushing, is a substantial box order from Tele. Communications Inc. McDonald says he has been talks with TCI, although the MSO has not yet committed to a purchase. McDonald remains optimistic.

"At this stage, we believe that all major cable operators plan to buy from us," he says.

Apart from Time Warner's \$40,000 box order, the deals are relatively small, at least initially.

McDonald declines to supply specifics, although he does acknowledge that the total order for 1998 includes the Time Warner chunk. He also points out that, of the nearly 1 million-box total, some are completed orders while others are preliminary letters of intent with commitments from the buyers to convert them into purchase orders.

The 1998 orders are worth about \$240 million,

McDonald says.

More important than the size of the order, he adds, is the fact that S-A "has identified 27 cities to install integrated interactive networks." He's counting on those installations to up the box orders over time, and he projects that S-A ultimately will have more than half of the market share in digital set-tops.

"Once you put in the network, the [MSO] customer keeps adding boxes to the network as the subscriber base expands," says McDonald. "The important part is the 27 cities." He did not identify the cities.

There are key differences between the Explorer 2000 and early generations of other set-tops. The Explorer includes a cable modem, with an appropriately equipped network it's capable of delivering full video on demand, a longtime goal of the cable industry.

That means the boxes, which McDonald says are fully compliant with Open Cable standards, are specifically designed to work on a two-way interactive hybrid fiber/coax network.

Although S-A is using PowerTV's operating system for the Explorer 2000, it hasn't ruled out using others. McDonald notes, though, that "no one has asked us to provide a different operating system."

S-A is also talking with a variety of companies, including Microsoft, Sun, Oracle, Hewlett-Packard Inc., Starlight, Pragma Guide, Prologix, Toshiba, WorldGate, Wink and others about software applications to run on the Explorer box.

—Pina Colman

Consumers Survey

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This article submitted by Dale Cripps on 1/16/98.

News Item

ARLINGTON, Va., Jan. 9 /PRNewswire/ via HDTVNEWSLETTER --

Sales of digital television sets would quadruple if manufacturers lower prices, according to a new survey sponsored by A.T. Kearney, Inc., a global management consulting firm.

Results of the consumer survey, which polled 1,000 households before the holidays, showed that price is the most critical variable driving consumer purchases of digital television sets.

"Consumers are excited about digital television, but right now the premium prices that the sets are expected to command will keep consumers out of the stores," said Joseph Kraemer, vice president of the communications practice at A.T. Kearney. "The lower the price, the faster the penetration of digital television in the United States," he said.

The survey found that price is the most critical variable driving consumer purchases of digital television sets. At a premium of \$1,000 over analog television sets, only six percent said they were likely to buy a digital set. But when the premium fell to \$500, the number of potential buyers jumped to 24%. "Price is the one factor that many manufacturers can control to accelerate penetration," Kraemer said.

Unless the sets become more affordable, most consumers are likely to wait years after digital television service has been introduced before buying a digital television set.

Major broadcasters will introduce a new digital television broadcasting service in 1998. Consumers will need to purchase a digital television or a converter box to take advantage of the new services. The new digital broadcasting ultimately will replace the 50-year-old analog service.

Digital broadcasting will offer a wide variety of services, including high-definition television (HDTV). The service also could deliver about 30 channels or more in a given market, offering consumers an alternative to cable or satellite television.

The survey also found that a sizable percentage of consumers would drop their cable or satellite service if they could receive numerous channels free through digital television. Because price is such a concern to consumers, the price of a digital set could be offset by the reduction in monthly payments for cable or satellite service.

"This new piece of information about the willingness of consumers to drop other television services could be used as a marketing tool to boost consumer interest in digital television," Kraemer said.

Other survey results:

Asked whether they would access the World Wide Web through their digital television, 63% said yes.

This could double Internet penetration in U.S. households.

Asked to name what will most influence a decision to buy a digital television: 42% said cost; 22% said analog service terminating; 20% said to replace a broken set; 11% said for quality and/or service.

Assuming a reasonably priced set, two out of three households said they would buy a set within five years of introduction.

The survey of 1,000 households was conducted over the telephone in November by Caravan Opinion Research Corporation International. A.T. Kearney's Communications Industries consulting practice serves clients around the world in the telecommunications, wireless, entertainment, broadcasting, publishing and electronics industries and regularly analyzes consumer and technology trends, and other major government initiatives that affect these converging industries. Chicago-based A.T. Kearney is one of the top 10 management consulting firms in the world. With more than 60 offices in 30 countries and almost 4,000 employees, A.T. Kearney provides strategic, operational and information technology consulting services to the world's largest companies through 11 industry practice areas.

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August 29, 1997

The Two Sides of HDTV: Which Will Go First?

By JOEL BRINKLEY

With the introduction of digital television only about a year away, leaders of the three major television networks are caught in a standoff with television manufacturers.

The network executives say they cannot move forward with plans for the new service until television manufacturers commit themselves to producing enough affordable sets to receive the programming.

"We all need to work together on this, or there's going to be a train wreck," said Preston Padden, the president of ABC.

And at NBC, the president, Robert Wright, complained, "Manufacturers have not locked in well-communicated marketing plans; I don't know what they are doing at Sony, Thomson, Panasonic."

But equipment manufacturers are voicing their own complaints. They say they are hamstrung because the networks have been too slow to declare their own intentions.

"We are very focused on the digital transition; it's the only way we are going to survive," said James Meyer, executive vice president of Thomson Consumer Electronics, the United States' largest television manufacturer. "But if the broadcasters don't choose to offer products that take advantage of this, then that's another thing."

As Jack Bergen, a senior executive at CBS, ruefully observed: "The networks are waiting to see what the TV makers are going to do, and the TV makers are waiting to see what the networks are going to do."

The broadcasters and manufacturers have much at stake, as does the viewing public.

Using digital technology, the networks hope to "reinvent themselves," as Padden has put it, and stop the steady decline in viewership that is afflicting the networks.

Consumer electronics companies, meanwhile, have seen lackluster profits recently and consider high-definition television sets to be the most important new product in decades.

But the manufacturers say they want assurance that the networks will actually broadcast high-definition programming -- rather than use digital

compression to squeeze more channels of conventional programming into their space on the airwaves.

Under government order, network-affiliated stations in the 10 largest cities must begin digital broadcasts next fall, and the other stations are to follow over the next few years. But stations are free to offer a single digital, high-definition signal on their new, digital channels -- or several lower-definition programs in the same space.

At ABC, a unit of Walt Disney Co., Padden gave a speech two weeks ago suggesting that ABC would forgo high-definition broadcasts and offer several channels of pay-TV shows instead. In an interview this week he said "a prime reason we decided to step out and say this publicly" was to reduce the uncertainty among manufacturers.

But Padden's speech appears instead to have caused further confusion. ABC has still made no formal decisions, Padden asserted again this week, leaving manufacturers unsure of the network's real intentions. But if ABC is even considering abandoning **HDTV**, television manufacturers now say they worry that the other networks might eventually choose the same course.

Joseph Flaherty, a senior vice president at CBS, said he believed the two industries should convene a formal meeting.

"If everybody waits for the other guy in this chicken-and-egg thing, then I wouldn't be surprised to see broadcasters just digitize their current signals and send them out," he said. "And that won't help the manufacturers sell even one receiver."

Still, for all the interindustry debate, both sides appear to have made many decisions, even if they have not issued press releases.

Michael H. Jordan, the chairman of CBS, a unit of Westinghouse Electric Corp., has long been an enthusiastic supporter of **HDTV**, calling it "the greatest benefit of digital" television.

Although some other executives at CBS have begun expressing disagreement with that, Bergen said that Jordan's view had not changed. CBS, he said, will broadcast some high-definition programming.

So will NBC, part of General Electric Co., Wright said in an interview: "We have made our decision. Broadcasters have to embrace high-definition television. We cannot afford to have anything but the best picture. If HBO is going to do it, then I'm going to do it. That's my starting and my ending point."

HBO, the cable TV company owned by Time Warner Inc., announced in June that it would begin offering high-definition programming next summer.

But Wright went on to say that NBC was expecting a commitment from the manufacturers. "The business plans for high-definition broadcasting are pretty skinny right now," he said. "Manufacturers have to make it affordable for us. This has to be a good deal for manufacturers and ourselves."

Wright was talking about not only the cost of television sets but also the cost of equipping stations with new production equipment.

Larry Thorpe, a vice president with Sony Corp., said his company "made an enormous investment in developing high-definition equipment beginning four years ago, at a time when the U.S. was in chaos." Nonetheless, he argued, Sony's **HDTV** cameras come "with a price premium of only 22 percent."

On the manufacturers' side, television makers describe a variety of business plans. All of them say they intend to sell digital sets next year that are capable of displaying images at the highest possible resolution -- 1,080 horizontal lines.

Beyond that, plans diverge. Afraid to give away secrets to competitors, manufacturers are loath to discuss prices. But in private discussions, different manufacturers said their starting **HDTV** prices would range from just under \$3,000 in one case to well over \$7,000 in others.

Thomson's prices are likely to fall in the middle of that range, but Meyer said that his company -- which manufactures RCA, GE and Proscan TVs -- would drop its prices quickly. He said, for example, that one of his current core products, direct-broadcast satellite receivers, would sell next year for one-third the price of three years ago, when the product was introduced.

"And there is nothing we manufacture that will not fit that price curve," he insisted.

At Panasonic Consumer Electronics, an arm of Matsushita Electric Industrial Co., Jeff Cove, a vice president, said, "That curve is quite typical for our business."

"Because of the chicken-and-egg thing," he added, "we are preparing products for every possibility."

Several manufacturers also plan to sell converter boxes next year or the year after. These would allow people who do not want to buy a digital TV to receive the digital signals on their existing sets, gaining a few additional channels but with little improvement in picture quality.

Even these boxes are not likely to be inexpensive. Meyer said he hoped Thomson's boxes would sell for "under \$700." And other companies said they expected them to cost at least \$350 or \$400.

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Will digital roll-out Delays lead to more options speed ITV, HDTV deployment?

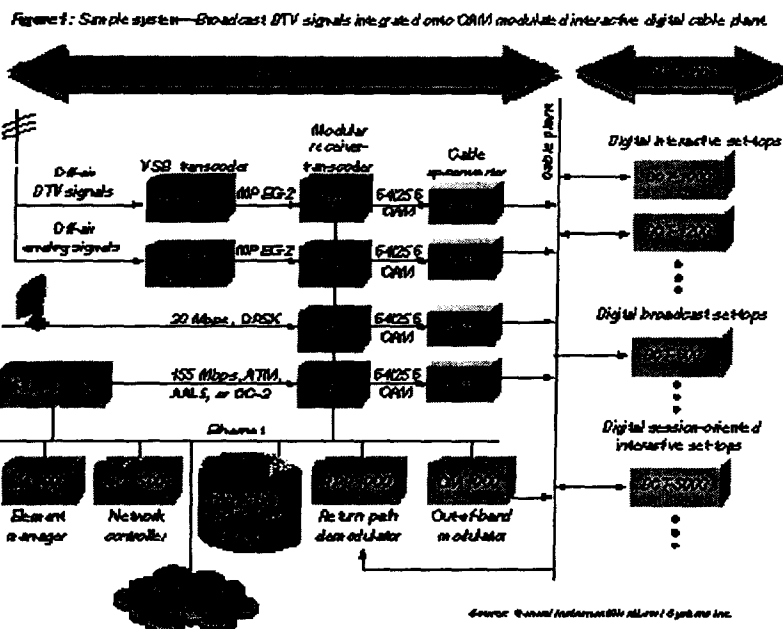
By Fred Dawson

THE CABLE INDUSTRY'S MOVE INTO DIGITAL TV has suddenly become much more complicated than the first phase of that process was expected to be, thanks in large measure to how long it has taken to get started.

Through the four-plus years since Tele-Communications Inc. CEO John Malone spelled out plans for the 500-channel digital TV system, operators waited for the boxes to arrive at price points they could work with, anticipating that first-generation digital represented a means of offering the customer more choices without eating up a lot of bandwidth.

Enhancements like high definition TV, on-demand video and fully interactive services were viewed as components of a fairly distant and largely indecipherable future that would be addressed once the initial digital platform was in place.

But a growing number of MSOs are recognizing the initial platform is going to be what was once considered second-generation, encompassing support for interactive video and HDTV, as well as broadcast standard definition digital TV. The shift in thinking is fueled by developments on separate fronts, where the success of Internet protocol and high-speed data technologies is opening opportunities for two-way multimedia just as the government and broadcasters have gotten serious about HDTV.



HDTV

"I think the industry, at the highest level especially, regards high definition as a top priority," says Richard Green, president of Cable Television Laboratories Inc. But, he acknowledges, the shift in focus is so new that engineers couldn't be blamed for declaring HDTV to be on a back burner, as some apparently did in recent discussions with a New York Times reporter about cable's digital TV agenda.

The article, which appeared May 5, asserted that "none of the major cable operators are making plans to provide high-definition programming." "The *Times* got it all wrong," Green says.

In fact, top-level attention is especially strong on the HDTV side at this point, given the industry's need to open a dialogue with broadcasters before it can formulate its own strategic approach to high definition. Cable CEOs, working through the executive committee of Cable Television Laboratories' board, have convened an ad hoc group under the leadership of Cox Communications CEO James Robbins to open a dialogue with broadcasters which they hope will help both industries to work cooperatively on bringing high definition and standard definition digital broadcast signals to cable customers.

"There are a lot of things we bring to the table that could benefit broadcasters as long as there's flexibility to do things in ways that aren't damaging to our interests," Green says. The crucial issue is how must-carry rules are applied in the digital domain, which is a major point of dispute between the National Association of Broadcasters and the National Cable Television Association as they lobby the FCC for an interpretation favorable to their interests.

Cable operators may want to transmit broadcasters' HDTV signals, Green notes, but they don't want to be forced, as they would be under a rigid interpretation of must-carry, to provide only one HDTV channel per 6 MHz channel if the digital

modulation system they are operating can support two. Moreover, cable operators want some flexibility in instances where broadcasters choose to multiplex several digital channels into the 6 MHz over-the-air feed rather than using the spectrum for a single HDTV channel. "If one of the broadcaster's digital channels is a CNN feed, you don't want to have to consume capacity for that when you're already delivering CNN," Green says.

Cable leaders hope to reach a compromise on a business framework that recognizes the mutual benefits of cooperation rather than engaging in a protracted battle that could end up in the courts. "What we have is a digital box that can translate broadcasters' (standard definition) signals for viewing over conventional TV sets, which gives them a market base they wouldn't otherwise have if they waited for consumers to go out and buy digital TV receivers," says a senior cable executive, asking not to be named. "One of the things we'd like to explore is the possibility of them sending us their signals over a separate feed using our modulation scheme, which would allow a direct pass-through to the set-top without incurring the costs of modulation conversion."

At some point, cable also hopes to get a better idea of the actual HD format broadcasters will use, though, at this point, most cable engineers assume their broadcast brethren will stay with the entrenched and bandwidth-efficient interlace approach rather than going to the progressive scan favored by the computer industry. So far, CBS is the only network to announce its choice, which is the "1080-I" interlace option.

Fortunately for cable, it can win an advantage no matter who chooses which format by being flexible enough to accommodate both, notes a senior industry executive, asking not to be named. "If we play our cards right, we'll be the one outlet through which consumers can get access to programming in both formats," he says. "To the extent we support both sides in this religious war, we'll help persuade manufacturers to offer receivers that are dual-purpose, and that will be a win for everyone."

By fall of next year, HDTV receivers will be on the market and, if broadcasters live up to their commitments, the big four network owned-and-operated affiliates will be putting out HD programming over the newly-allocated digital broadcast spectrum. That doesn't give engineers much time to sort through their options, notes Bob Zitter, senior vice president of technology operations at HBO, which has committed to providing an HDTV feed of at least some of its programming in tandem with the earliest broadcast startups.

Much remains to be worked out in the company's plans for the HDTV feed, Zitter says, including a choice of formats and a decision on whether to include programming created in NTSC along with the high-resolution, widescreen film and video material that accounts for about 70 percent of the network's content. "My staff and I are going to be quite busy dealing with these issues over the next year," he notes.

HBO and Madison Square Garden Network are the only cable programmers to make known their HDTV plans, but industry CEOs clearly expect more suppliers to step up to the challenge of providing an early package of product that would give cable a strong position in HDTV. "Comcast (Corp.) is prepared to make the technological commitment" to HDTV, says Comcast President Brian Roberts, but he adds, "Of course, we would welcome more programmers to help fill the digital pipeline we're building."

Cablevision Systems Corp. subsidiary MSG plans to begin an HDTV feed in 1999, with occasional HDTV broadcasts of major events slated to get underway in an earlier, as yet unspecified timeframe. Cablevision executives believe the popularity of sports, especially regional sports, could drive HDTV acceptance in advance of its acceptance through broadcast networks.

"Because we have a bandwidth-rich distribution system, we can close the loop on getting high-appeal regional sports programming to customers no matter what the rest of the country is doing," says Marc Lustgarten, vice chairman of Cablevision. "By 1999, virtually all of our New York ADI will be served by 750 MHz capacity networks, which gives us the ability to support HDTV as well as a wide variety of discrete digital programming."

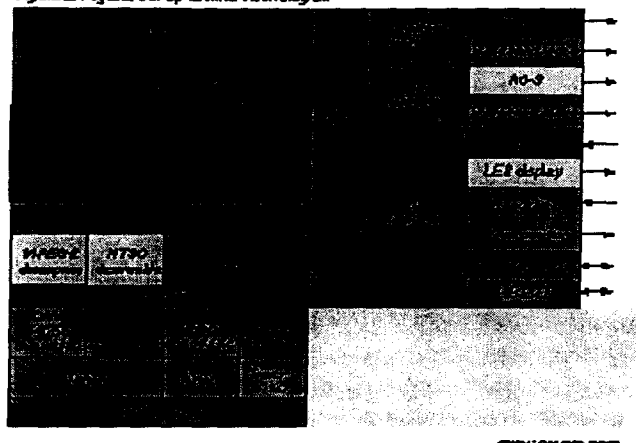
More than just programs

At this point it seems quite possible that cable engineers will be dealing with a larger cable networking dimension to HDTV than that represented by broadcasting alone, possibly even involving more cable programming feeds than broadcast. As Zitter notes, there's a fundamental business imperative behind HDTV that makes moving in this direction an obvious step for suppliers of premium and expanded basic programming. "The initial purchasers of HDTV sets will probably be HBO subscribers," he says.

"Cable guys have enough on their plates already, but it's really important that we as an industry have a strategy where HDTV is concerned," Green says. "As we study these issues, people are going to become more and more concerned. It's a real puzzle when you start to think about it."

No HDTV-related technical issue is more important to cable than figuring out what new functionalities broadcast standard and high definition as well as cable-programmer HDTV feeds will impose on set-top boxes. Initially, cable can expect to pass HD signals through on channel without decoding them at the set-top, given the fact that all HD receivers will be equipped with decoders. Cable interests hope to persuade television set manufacturers to include a QAM (quadrature amplitude demodulation) chip in the receiver, but might ultimately want to perform the demodulation function themselves so as to be able to mix different types of feeds at the set-top, such as might be used in providing a cable-derived data feed to enhance the value of a broadcast HDTV feed delivered in VSB (vestigial sideband) modulation.

Figure 2: Pegasus set-top terminal block diagram



Fortunately for operators, consumer electronics manufacturers appear open to cable's needs. "They're generally fairly receptive to having a QAM receiver in the cable-ready HDTV receiver," says Bill Wall, chief scientist for Scientific-Atlanta's subscriber systems unit. Working with both the Society of Cable Telecommunications Engineers and the broadcast digital-oriented Advanced Television Systems Committee, Wall says he and his colleagues have been in regular contact with consumer electronics manufacturers.

"It's no great leap technically to build a single chip to do both VSB and QAM demodulation, because the two techniques are quite similar," Wall says. However, he adds, "I'm not aware of anybody building this part today."

But merely being able to pass the HDTV signal through to the receiver for decoding won't placate cable's needs for long, says Bob Van Orden, director of digital video systems for Scientific-Atlanta. "It's very hard to predict demand, but I'd venture that it will be the set-top, in our case a next-generation version of the Explorer, that does both HD and standard digital decompression," Van Orden says.

There are two primary reasons operators would want to do the decoding in the set-top rather than relying on the HDTV receiver, Wall notes. For one thing, he says, operators are likely to want to feed the HDTV formatted programming to analog TV sets to expand the market base for highly appealing programming that might not be simulcast by broadcasters in analog iterations.

In addition, he says, "There's an issue with reception of other services with HD programming, such as data content." Boxes like S-A's Explorer are built to support the combining of IP-based data with digital TV, which is seen as the basis for the new generation of interactive programming and gameplaying.

Fortunately, the headend changes needed to accommodate HDTV appear to be significantly less challenging than those involving the set-top and its interface with the TV receiver. "Getting HDTV into the headend and putting it into the QAM modulated channel doesn't present insurmountable obstacles," Van Orden notes. "It's relatively straightforward." In fact, he adds, most stations in large markets are already supplying their TV feeds via fiber and so will present no

conversion problems at all for cable headends in their areas.

NextLevel Systems Inc. has begun development of an 8-VSB-to-QAM transcoder that's slated for shipment by the end of next year (see Figure 1). The modules will be compatible with existing headend products and will supply an add/drop multiplexing capability to support operator flexibility in packaging the different types of digital feeds from broadcast and other sources, says David Fritch, senior manager of marketing strategies for digital network systems at NextLevel.

ITV

This packaging capability is especially important as the action on the interactive side of the digital house gains momentum. The converging of the forces propelling interactivity, HDTV and standard digital TV has already brought high-speed data and set-top work groups together for frequent discussions at many MSOs and is certain to do likewise elsewhere as time goes by.

"We're all working very closely together to make sure we make the right decisions as we go forward," says Will Richmond, vice president of business development for MediaOne Express, MediaOne's high-speed data unit. "The delivery of video-enhanced types of applications is going to be a key differentiating factor for our services."

The technical components are in place to support a new class of service, typified by a news-on-demand site the MSO is preparing to introduce. Along with local news, the video-enhanced content will include local sports with streamed video clips and other "hometown" content running at up to 20 frames per second (fps) in three-quarter-screen resolution at the PC. This is a far cry beyond the postage-stamp sized, 1-10 fps streamed video clips now available over analog dialup links.

Time Warner's Excalibur group is another high-speed data unit staying in tune with activity on the digital TV side of the company's operations. In May, Time Warner officials and vendors responding to the MSO's request for information covering VOD and Internet protocol-enhanced applications met in Denver to get a better understanding of how the company can exploit the modem and VOD capabilities of its Pegasus set-top box (see Figure 2).

"There's a lot of cooperation going on between our group and theirs," says Excalibur Senior Vice President of Programming Carl Rogers. The focus within Rogers' group is on multicasting, where streaming technology is used to distribute live events, games or other content at specific times to customers, complementing the video-on-demand and HDTV features inherent to the design planning on the Pegasus project side.

"We're really focusing on the service strategy as the way to extend appeal of Road Runner beyond the early-adopter phase," Rogers says. Some unspecified pieces of these new services, with local as well as national content, will soon be tested over various Road Runner systems, with the intention that, by the second or third quarter of next year, the company will be in a position to re-release Road Runner, Rogers adds.

While Cablevision Systems Corp. hasn't announced the vendors for its newly-revised digital TV strategy, its approach is looking a lot like that of Time Warner

and MediaOne, where the set-top is designed to handle IP-enabled content components as well as to support delivery of video-on-demand. After testing VOD in a 400-customer market trial over the past year, the company has decided to make movies-on-demand and other interactive services part of the venue as it moves to digital TV, says Wilt Hildenbrand, vice president of engineering at the MSO.

"We're migrating the online data side of the interactive technology into digital TV technology now," Hildenbrand says, declining to specify a rollout date. "With the capabilities that manufacturers are building into the digital set-tops, linking online elements across to the TV is almost root-level stuff."

Better tools for digital

Indeed, with network operators now getting serious about rolling out digital TV, vendors are scrambling to come up with means to add flexibility while reducing the costs of moving signals over networks and processing them at headends. Along with spurring activity among traditional suppliers of headend and set-top gear, the move to digital is drawing in new players, such as Lucent Technologies Inc., which has taken the extraordinary step of moving new digital TV encoding and decoding products into production under the direction of its Bell Labs R&D unit.

"There's still a lot of uncertainty about timing and strategies, but digital is an area we have to be prepared for, because it is an important part of the communications future," says Carl Hsu, vice president of advanced technologies at Bell Labs.

Lucent, like other vendors, sees opportunities for lower-cost, high-performance encoders, protocol convertors, media servers and many other products that are essential to widescale, efficient distribution of digital TV content. "We have to move cautiously because of all the uncertainty that's out there, but we're addressing the needs as they become clearly defined," Hsu says.

Harmonic Lightwaves Inc., too, has added MPEG and other digital video components to its product development activities, recognizing that integration of the pieces with the transmission gear at the headend is essential to lowering costs and making more efficient use of headend space. "We see integration of digital at the headend as a major need in the industry," says John Dahlquist, vice president of marketing at Harmonic.

The company's first product along these lines will be a QAM module that fits into Harmonic's optical transmission platforms, with initial units due for delivery by mid-summer, Dahlquist says. "The QAM modules will take up three rack units of height and be under software control for changing the QAM levels from four all the way to 256," he adds, noting the company thinks it can cut 30 percent off current QAM costs of \$5,000-\$7,000 per channel.

Similarly, Harmonic is working on integratable MPEG-2 encoder cards with software interfaces for direct management control. "We're designing the product so that 10 encoder cards fit in an eight-rack unit," Dahlquist says, again citing cost reductions over existing gear in the 30 percent range.

Harmonic encoders went into interoperability testing in June, with rollouts slated for later in the year. The initial versions, generating signals at two to 15

megabits per second, will operate at constant bit rates within any given speed domain, with variable bit rate and statistical multiplexing capabilities to be added later, Dahlquist says.

Statistical multiplexing, used in conjunction with variable bit rate encoders, has become a hot development in the push for ever more bandwidth efficiency in the MPEG domain. Now it's moving into the headend.

One of the companies in the vanguard of this effort is Imedia Corp., which has decoupled the stat mux from the encoding process so that operators can add a local MPEG programming or advertising insert into a stat-muxed satellite MPEG feed without having to decode and recode the local signal. "We can take a constant-bit-rate encoded as well as variable-encoded feed," says Adam Tom, vice president of business development for Imedia.

"We're able to separate the statistical multiplexing from the encoding location because we don't require any feedback between the two processes," Tom says. "The encoder can be in L.A., and the statistical multiplexer can be in Denver, which not only cuts encoding costs in managing and packaging content but also allows operators to purchase the most cost-efficient encoders without having to use that vendor's statistical multiplexing system."

Manufacturers remain hampered by indecision about digital strategies on the part of cable operators and broadcasters, notes Lucent's Hsu. But the market message is clear enough now to move things into high gear, he adds.

"All the action is in data and video, so, we as a communications systems supplier, have to go where the action is," he says. For example, he notes, it's logical to assume that Lucent, after working closely with Time Warner and Silicon Graphics Inc. on the now-defunct Interactive Digital Solutions venture, would be ready to respond to calls such as Time Warner's recent RFP for video-on-demand technology.

"I can't comment on specific projects, but you can draw your own conclusions," Hsu says. ◀ ■

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Operational issues for digital have arrived



Just a few short weeks ago, the Federal Communications Commission adopted, after an eight-year-plus proceeding, the Report and Order that gives a second, free, over-the-air broadcast channel to every licensed broadcaster that will agree to provide "digital TV service" in its existing market.

Contact Wendell via e-mail at:
wbailey@prodigy.com

The FCC rules under which this service is to be offered are rather strict. The broadcasters in the top-10 markets must begin providing a digital signal within two years, and there are different, but strict, timetables for those in the second and lower markets.

The NCTA has, for several years, had a consistent position on how, and under what circumstances this allotment would take place. Needless to say, the FCC did not adopt our stance, but that's not the issue that I want to discuss today.

The \$64,000 question

A set of more practical issues for a cable television operating engineer to tackle begins with, "how, exactly, are we going to handle the transmission of the over-the-air signals that will begin to arrive at our headends in the immediate future?"

So many people have called to ask me this question in the past few weeks that, by now, everyone must know my answer: I don't have a clue! It's not just that we have lost the must-carry case (Supreme Court, 5-4 in favor of must-carry), or that the FCC has yet to speak to the issue of whether or not these new digital signals should enjoy must-carry status. No, these are issues that will be worked out eventually, and at that time, we will find that, whichever way it goes, we'll have our options and responses changed by the decision that the FCC makes. The operational issues that will confront us in the next two years are much more prosaic.

If a broadcaster can compress his/her signals at a 5-to-1 ratio on a single, 6 MHz slot, and the cable operator is to use "statistical multiplexing" to achieve a 15-to-1 compression ratio, does this mean that we would have to give up 10 potential channel slots in order to carry one of the new broadcast channels? In the digital world, is it even fair or proper to speak of a television channel as a 6 MHz slot? What about the case where we have come to terms with the carriage issue and are face-to-face with the issue of delivery-we carry the digital

broadcast signal to our customer, and he/she only has an analog TV set.

Several questions arise: have we "delivered" the signal? Do we care if the subscriber can see it (it might be a great program)? If we put a digital set-top in the subscriber's home to receive our own digital offerings (64 QAM), will that unit be able to handle the modulation method that the broadcaster uses (8 VSB)? How about if the FCC requires must-carry and does not allow the cable operator to re-modulate the digital signal of the broadcaster, and you (the operator) are sending QAM signals to a subscriber who has a new VSB TV set? Then there is the issue of "re-packing": taking the four or five SDTV (Standard Digital Television) signals that the broadcaster sends out and fitting them into the 12-18 signals that an operator might be able to generate using a stat mux system. See? It gets complicated very quickly.

Chomping at the bit

It seems that we need to have a matrix drawn up just so we can see what we must do once digital signals begin to proliferate. And proliferate they will. The FCC order will no doubt be challenged by someone as too much too soon, but there are stations out there that are anxious to get going with digital signals. There are even a few who are intending to be on-the-air with true digital high definition signals in the mandated timeframe.

This creates another problem for us to fit into a matrix of issues. How do we handle a situation where the broadcaster sends out a high definition signal for a part of the broadcast day, and switches to a group of five SDTV signals for the rest of the day? Does this mean that we in the cable world have to rearrange our channels once or twice a day?

Real, live digital

In the land of cable television, there are already several places where digital signals in groups of six or eight per 6 MHz are being delivered to real, live cable subscribers. The word is that they like what they see. While we have several new services to offer our subscribers, some part of our efforts must be devoted to dealing with the issues above.

Broadcasters have proven that they know how to deliver programs that attract a large number of eyeballs. True, the cable programmers have shown (lately) that they can compete head-to-head for the same viewer and win a fair share of the ratings, but it would be foolish to ignore the track record of the programming that comes to us from the over-the-air source.

Surely there will be offerings in the broadcasters' digital emissions that will appeal to a large portion of our customer base. We will have to find a way to get the signals to them. At the same time, we must run our own digital channels in such a way that we can offer the services that our program community will develop, and that our subscribers will surely want to see.

Once again, the people on the frontline have their work cut out for them. ◀ ■

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USA TODAY Tech *Tech Report*

08/03/98- Updated 07:39 PM ET

The Nation's Homepage

CES preview: Going digital means sharper boob tubes

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In 1955, football fans were awed by NBC's broadcast of Georgia Tech vs. Miami - the first football game broadcast in color.

The January 1999 Super Bowl broadcast might be just as dramatic. It could be the first football game broadcast using a digital signal beamed to digital television sets. Viewers who buy high-definition TV (HDTV) sets would see the game bigger, more clearly and more lifelike than ever. The event would usher in TV's digital era.

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Football-phobes who flip the channel might get a treat, too. Digital TV will give each major network the ability to split its signal into five, 10, maybe 15 channels. Each extra channel could offer something different - news, sitcoms, movies. All would be available over the air, no cable lines or satellite dishes needed, and they'd be sharper than TV pictures available today.

The beauty and flexibility of digital television will be so great, says Federal Communications Commission Chairman Reed Hundt, "it will ultimately completely change the nature of the medium."

But how, exactly? Television is the most powerful medium on earth. There's a TV in 99% of U.S. homes. Fewer homes have indoor plumbing. An overhaul of the medium would have some effect on most people's lives.

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The major networks, local TV stations, program producers and TV-set makers are just beginning to figure out what they might do with digital TV. At the sprawling Consumer Electronics Show in Las Vegas this week, only a handful of digital TV products are on display.

Most importantly, the FCC just passed rules Dec. 26 that set standards for digital TV. The ruling finally lets companies start making solid plans. It also sets up some bare-knuckled fights and politicking among broadcasters, cable operators, programmers and even the computer industry.

"They're all grappling with this now," says Mary Frost, a managing director at Price Waterhouse.

Still, TV executives and experts - who've been talking about HDTV for more than a decade - know enough to outline some of what consumers might see as digital TV unfurls.

The hardware

This is not your father's television. Digital sets will have more in common with PCs than with today's analog TVs. The good news is that TVs will be better than ever. The bad news is that sometime in the next 10 to 15 years you'll probably have to replace all your current sets.

Digital signals will come in via the same beams that now bring broadcast TV channels. But today's TV sets won't be able to understand the digital signals. Digital TVs will hit the market in 1998. They won't look much different except they'll be more rectangular, like a movie screen. Their insides will have computer chips and memory, like a PC. At first, they'll cost \$1,500 to \$3,000.

"But the prices will drop dramatically the first few years," says Dennis Wharton of the National Association of Broadcasters - especially once consumers start buying large numbers of digital TVs.

Digital TV sets would be able to display both HDTV pictures and digital TV pictures. A local TV station might choose at times to use all of its signal to send out one dense HDTV picture - probably for movies or sports. That broadcast would be a fantastically sharp, wide-screen picture with six-channel surround-sound. But the TV station at other times might choose to split its signal into five to 15 digital channels. Those channels would not look as good as HDTV but look better than current analog channels.

Another way to get digital TV will be to buy or rent a set-top box, which might look like today's cable TV boxes. Digital TV boxes would have computer-like insides. They'd plug into a regular TV and use the TV as a monitor, the way a PC connects to a monitor. The drawback would be that the picture would not look as sharp as on an all-digital TV and it could not show the full width of an HDTV broadcast.

No one is making digital converter boxes yet. No one knows how much they might cost, where you'd buy them or whether broadcasters would rent them the way cable operators do.

Consumers won't have to buy anything right away. The FCC's plan is to have a slow phase-in of digital TV. For years, broadcasters will continue to send out analog signals along with digital signals. Owners of regular TV sets will continue to get broadcasts much as they always have. But people who buy digital sets will be able to get the sharp pictures and extra channels. It will likely be more than a decade before the analog signals disappear.

"This is an opportunity to spend lots of money," says analyst Frost. "People will have to decide whether it's worth it and in what time frame."

The delivery

Once digital TV arrives, the question of who will deliver programming will get interesting.

Take the Atlanta market. Four network affiliates broadcast there, plus six independent stations. If they all go digital, each could multiplex its signal into, say, 10 channels. (No one knows for sure how many digital channels will ultimately fit on a broadcast signal.) Suddenly, there could be 100 channels available over the air, all looking sharp and free of snow or static.

At that point, broadcast seems to become a competitor to cable and direct broadcast satellite. ABC affiliates might start sending out ESPN and ESPN2, both owned by ABC, via digital broadcast. NBC affiliates might do the same with CNBC and MSNBC.

In fact, channels like ESPN and MSNBC - or new movie channels or other specialized channels - could be scrambled. Consumers would then have to pay a subscription fee to get them, making broadcast TV very much like today's cable.

Cable operators will probably go digital to stay competitive. That would increase the number of channels available via cable to 200 to 700. And cable could offer two-way interactivity - something broadcasters could never do.

What's not clear is whether cable would carry all those new channels broadcasters start pumping out, or whether cable companies would have to let digital broadcasters buy and air cable-owned channels, such as CNN and Discovery Channel.

Sound confusing? You bet. It's a major concern of digital TV proponents.

"There are big battles coming," says Hundt. "I'm hopeful people in the business will see the perils of this to consumers."

The programs

Once digital TVs land in homes and delivery systems are ready, what will consumers actually see on their screens?

At first, not much. Look at NBC's tentative plans, outlined by Mike Sherlock, the network's executive vice president of technology. NBC will start by aiming at the early, high-end HDTV fans, using the digital signals to show prime-time movies and TV shows shot on film. Anything shot on film is easiest to convert to HDTV because it is already the right size and clarity for HDTV, Sherlock says. About two-thirds of NBC's prime-time schedule is filmed.

During the day, NBC will split the signal - at first, into three or four channels. "One might be soaps, another might be news, another movies or children's programming," Sherlock says.

NBC will also try sending data along with shows. The digital signal can carry piles of information which could be called up on the screen - or not - much like data on a World Wide Web page. Watch Seinfeld and, in a corner of the screen, tap into the equivalent of a Seinfeld Web site.

Sports will likely get early HDTV treatment. It probably will be one of the first ways the Fox network uses digital TV.

"Our mission is to bring the viewer as close to an event as possible," says Jerry Gepner, a senior vice president for Fox Sports. "HDTV will knock your socks off." Fox also is considering sending related Web-style data along with a sporting event. Of course, the networks hope local affiliates spend tens of millions of dollars to convert to digital. The networks can send out HDTV or multiplexed digital signals, but affiliates have to relay the signals to homes. If they don't, the change to digital will bog down.

Beyond the early plans at NBC and Fox, the networks don't yet know where they'll go with digital television.

They'll wait to see whether audiences want HDTV's better pictures or more channels. They'll wait to see how quickly digital sets penetrate the market. They'll wait to see what creative people do with the technology.

As Sherlock says: "Producers and creative people have not really digested what's coming yet. It's only been the technologists working with it so far."

Other stuff

The huge capacity of digital TV might open up some other interesting possibilities. For instance, Hundt is pushing for strong public interest requirements for broadcasters. In effect, the FCC is giving broadcasters valuable airwaves so they can send out both analog and digital signals for the next decade. In return, the FCC wants to make broadcasters allot a certain number of hours to educational programming and free air time for political candidates.

Unusual new alliances might spring up. Newspapers could ally with broadcasters. A digital channel could be used to quickly dump an electronic copy of the newspaper into PCs armed with a tiny antenna.

A software company such as Microsoft could use a digital channel to send updated copies of computer programs to PCs. (Tune in at 7 p.m. for the latest version of Windows!)

Clearly, a lot is up in the air. Plans for digital TV could be altered five times between now and 1999. But digital TV is coming. More than likely, it will be much bigger than the advent of color TV. Sometime in the next decade, the very idea of television is going to change.

By Kevin Maney, USA TODAY

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08/03/98- Updated 08:23 PM ET

The Nation's Homepage

Why cable firms love digital TV

none There are distinct advantages for the *cable* world in going *digital*.

Once a video image has been *digitized*, it can be manipulated without loss in picture quality - which is vital to *cable* companies that need to process a signal several times before redistributing it to customers. In the analog world, the video degrades a bit with each video distribution process.

Digitally, that same picture arrives at customers' homes in pristine condition.

Using compression techniques, *cable* operators also can create several *digital* signals in the space taken by one analog signal, increasing the channel capacity. Depending on the compression technique, the *cable* industry is commonly converting one analog channel into four to six *digital* channels.

In a system that now has 78 channels, for example, the operators could reserve 40 channels for basic analog service and *digitally* compress the rest, for a total of more than 200 channels. A pay-per-view movie could easily be delivered on several channels with different starting times, getting customers closer to the video-on-demand ideal with very little waiting time.

Multimedia applications and online interactive services also will be increasingly available in the *digital* era.

Tele-Communications Inc.'s (TCI) *digital cable* pilot tests have taken some of those steps. In addition to analog offerings, the *digitized* network offers various packages featuring additional general entertainment networks, pay-per-view channels and premium-movie channels.

The selection of the new *digital* services available from TCI vary widely among systems. They depend on the number of analog channels available (45-55 is average for TCI systems) and a customer's previous selection of certain premium services.

For example, viewers who have HBO as a premium channel on a TCI system may get HBO2 and HBO3 on the new *digital* service. Those that do not have HBO service may not.

In one example of a *digital* package that will be offered in a Denver suburb, 65 channels of analog programming are supplemented by 18 additional premium *digital* channels (including such wide offerings as HBO2, ESPN 2, Classic Sports and CBS Eye on People), eight additional pay-per-view channels and 10 DMX audio channels, offering commercial-free music in various genres.

Viewers can customize the arrangement of channels with a "navigator" interface. Clusters of movie, sports or comedy

channels can be segregated next to each other for easier surfing. Parental lockouts by title and rating are available. Customers also have the ability to program on-screen reminders to pop up at selected times to remind users of shows.

TCI is offering its new *digital* service at an added \$10 monthly fee for customers who have its basic service. Such tests are "still at a very early stage," says *Cablevision* magazine's Craig Leddy. But, as *digital* and HDTV technologies "take hold and make economic sense for the system operators, you'll see the rollout move pretty quickly."

By Bruce Haring, USA TODAY

08/03/98- Updated 08:23 PM ET

The Nation's Homepage

HDTV hits broadcasters in the wallet

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NEW YORK - Don't feel bad if you don't know what the major television networks and stations will **broadcast** next year when they introduce digital TV.

They don't know either. And that soon could become a big problem.

Broadcasters are already spending millions for DTV equipment. Yet, as Meredith CEO William Kerr put it, "we haven't figured out a way to make any money" from the DTV investments.

As a result, executives are struggling with fundamental questions - including the extent to which they should use digital **broadcasting** to offer high-definition TV (**HDTV**).

"We're still formulating our plans and talking to our affiliates," Westinghouse CEO Michael Jordan says.

Executives are moving slowly because "these decisions will live with you for the next 50 years," NBC Television Stations President Scott Sassa says. What's more, "the complexity of all the different parts is like three-dimensional chess."

To lessen their risks, **broadcasters** are considering alliances with other companies that have a stake in DTV. The major networks are talking to TV set manufacturers, satellite companies and cable operators. But there's no sign that anyone is close to striking a deal.

Time is critical

Broadcasters can't dally too long. About 26 stations are committed to launch the DTV era next October. By the end of 1999, stations reaching more than half of all viewers must offer some DTV programming. Today's analog **broadcasting** is supposed to sign off by the end of 2006.

Networks and their affiliates in big cities will be first up with DTV and are making key investments. ABC, for example, has spent more than \$55 million upgrading the No. 3 network's equipment to offer DTV. CBS plans to spend \$100 million at its 14 stations so they can go digital.

Most local stations expect to shell out from \$2 million to \$14 million for the transition. Those are daunting sums, even though the networks have vowed to help pay for some equipment. Several stations will have to spend more than they are worth to make the transition to DTV.

"A lot of smaller owners wonder whether it makes sense to stay in the business," says Royce Yudkoff, managing partner with TV station operator and financier ABRY Partners.

Virtually everyone is concerned with the cash they stand to lose from DTV. Even National Association of **Broadcasters** (NAB) President Eddie Fritts, a DTV supporter, likens it to "a loss leader in a retail store."

Fears about *HDTV*

The biggest deficits could come from the best known DTV application - ***HDTV***.

Advertisers, who supply nearly all of a station's revenue, probably won't pay significantly higher prices for spots to run in ***HDTV***. It will take years for the new movie-screen shaped sets to infiltrate most living rooms. Receivers are expected to cost thousands of dollars when they ***hit*** stores next year.

Even when the sets become less expensive and more popular, the super-sharp programs won't necessarily attract more viewers.

As a result, ***broadcasters*** may transmit little ***HDTV*** programming. USA Networks CEO Barry Diller says he does not believe ***HDTV*** "will ever be the mainstay of our ***broadcast*** signal."

But networks and stations probably can't afford to abandon ***HDTV*** completely.

That became clear in September. Some members of Congress became livid when ABC Television Network President Preston Padden and station owner Sinclair ***Broadcasting*** publicly discussed a bold alternative strategy. They wanted to use DTV to compete with cable and satellite ***broadcasters***.

Here's how it would work: Instead of devoting nearly all of the digital spectrum to an ***HDTV*** transmission, a station could split its signal into about five standard quality channels. If several local stations did the same thing, they could collectively offer consumers a package of services, possibly including such cable favorites as CNN, MTV and ESPN. Those channels would be available to subscribers with set-top decoders who pay a monthly fee to the ***broadcast*** group.

Advocates say this plan, called multicasting, would enable stations to compete for the \$30 billion a year that consumers spend on subscription TV. "Despite the fact that we ***broadcasters*** have the most expensive, most sought after and most watched programming in the business, the networks and our affiliates get virtually none of that revenue," Padden said in August.

But several legislators likened the proposal to a bait-and-switch scheme. "Congress would not have given ***broadcasters*** as much spectrum as we did if there wasn't an expectation that they would move to ***HDTV***," House Telecommunications Subcommittee Chairman Billy Tauzin, R-La., said. "***Broadcasters*** need to understand that this is not a 6-for-1 stock swap."

The Clinton administration, for its part, says ***broadcasters*** - and

the market - should decide whether **HDTV** or multicasting wins out.

Fading multicasting

Still, multicasting's prospects appear to be fading.

Padden backpedaled in September. He told the Senate Commerce Committee that ABC does not have a plan to transmit subscription programming. He said that the network is "committed to giving **HDTV** a fair market test." Padden declined to comment for this story.

NAB chief Fritts adds that **broadcasters**, who pay about \$15 billion a year for programming, would just hurt themselves if they offer multiple channels. "The audience is already fragmented substantially," he says. "Why would a **broadcaster** put on channels to fragment the audience more?"

The conventional wisdom is that the networks will initially offer some movies and splashy events - like the Academy Awards - in **HDTV** during prime time.

But it's unclear what will happen during the day. Some **broadcasters** are thinking about using multicasting. Viewers who missed, say, *Seinfeld* Thursday night might be able to tune in to the show Friday afternoon.

This plan would face stiff opposition. "It would be a nightmare for advertisers, programmers and probably for audiences, too," says TV station adviser Jack Fentress of Petry Television. "If you have *Seinfeld* on at four in the afternoon, don't you think it would have an impact on Oprah?"

Broadcasters also seem to be losing faith that they could make a profit by renting out their DTV spectrum to information and data companies. "What business data (needs) to be **broadcast**?" Yudkoff asks. "I just don't know."

By David Lieberman, USA TODAY



"Serving Educational and Commercial Customers Since 1985"

Digital TV, The Real Story

What is Digital TV? In April, 1997, the FCC announced that, by 2006, all television broadcasting would be digital. Digital TV broadcasting can deliver crystal-clear pictures that will approach the quality of 35mm movies and CD sound. One form of digital broadcasting will be HDTV (High Definition Television), which will provide the highest resolution quality picture. Besides providing incredible picture and sound, the new digital standard has enough room in its signal to allow TV stations to broadcast multiple programs at the same time, if they so choose. They can also deliver data services, such as electronic program guides or information related to the programs you watch.

When will TV stations start to broadcast digital signals? This will be an evolutionary process. According to the FCC, digital broadcasting must be available in each of the top 10 markets, covering 30% of households in the U.S. by May, 1999. By the end of 1999, it must be available in the top 30 markets, covering about 50% of the households. The FCC requires that all stations be 100% digital by 2006. Some broadcasters have announced they will begin transmitting digital programming as early as 1998.

Will TV stations stop broadcasting regular signals immediately when they switch to digital? No. Television stations are required to continue broadcasting regular TV signals along side the digital until 2006. Cable TV and satellite TV are not affected by this FCC ruling.

When will Digital TV sets be available? Products capable of receiving the new digital signals should begin to hit the market in 1998. This might include fully digital television receivers, digital tv monitors and digital set-top boxes.

Will I be able to adapt my current TV so that it can receive digital broadcasts? Several manufacturers will offer a new digital set-top box which will allow current televisions to display digitally broadcast programs. The picture and sound quality will be about the same as small dish digital satellite systems today. Conventional televisions will not be able to display the HDTV resolution quality.

Should I wait before I buy a new TV? Conventional broadcasting will continue for some time. At the early stages, digital television products are likely to carry significant cost premiums above that of comparably featured conventional televisions, and digital broadcasting will be available in limited areas. Any TV bought today will be able to work well beyond the digital deadline of 2006 with use of a set-top box, giving you the best sound and picture performance it has to offer. The cost of set top boxes and digital televisions are likely to come down over the next 10 years and you have plenty of

time to upgrade. Also, there is no current mandate which affects cable or digital satellite broadcasting, which is designed to work with regular TV.

The World of Digital TV - What DTV, HDTV, SDTV really mean. 'DTV' is a general reference to Digital Television technology. DTV broadcasts will either be HDTV (High Definition TV) or SDTV (Standard Definition TV). These have different levels of resolution - as high as 1125 scanning lines (interlaced), which is called HDTV or High Definition Television, to as low as 525 (interlaced or progressive) scanning lines, called SDTV or Standard Definition Television. Individual broadcasters will be able to choose in which format to transmit their programming. Most digital TVs and digital set top boxes will be able to receive the signals no matter what is sent out on the airwaves.

The FCC has allocated to each of the broadcasters a fixed amount of transmitting 'space' (bandwidth) for digital TV programming. At the highest resolution, one or two programs can be transmitted within that space and, at the lower resolutions, up to 6 simultaneous programs can be transmitted. Generally, the higher the resolution, the clearer the picture.

Broadcasters may choose to transmit different levels of resolution throughout the viewing day; perhaps broadcasting daytime programs in SDTV and switching to HDTV at night for movies or specials. At this time the major networks have not announced their specific plans. Both HDTV and SDTV are part of what's called 'DTV' (Digital Television) technology.

The differences between formats and resolution. The resolution formats available to broadcasters will include: '1125i', '750p', '525i' and '525p'. The 'i' refers to 'interlaced' and the 'p' refers to progressive scanning methods.

'Interlaced', 'non interlaced' and 'progressive' scan. A TV picture is made up of a series of frames. Each frame is created by an electron beam which rapidly scans horizontally across the face of your TV screen, from top to bottom. In today's TV, there are 525 scan lines in each frame. In an interlaced picture, the beam alternately scans the odd numbered lines and then scans the even numbered lines. This process is so quick that your eye sees only one complete image. In progressive, or non interlaced scanning, the electron beam scans all lines at once. In the HDTV mode, the proposed scan rate is 1125 lines (interlaced). SDTV might be 525 lines, interlaced or progressive. For DTV in the future, these choices will be up to the individual broadcasters. Today's conventional TV uses the interlaced scanning method.

Digital programs can be transmitted in wide screen. HDTV pictures will most likely be a wide screen format (like a movie theater) which is referred to as 16:9 aspect ratio (referring to the ratio between picture width and height). Today's conventional TV aspect ratio is 4:3. SDTV programming may be either. Keep in mind that wide screen programs will still be able to be viewed on conventional TV screens in letterbox format (black areas above and below picture). Likewise, regular aspect ratio pictures will be able to be viewed on a wide aspect TV screen, with the picture digitally 'stretched' to fill the screen.

Digital broadcasting and cable TV systems. Your local cable company will have no technical problem providing digital television programming material, however it may not be in the HDTV or SDTV format. It will be in whatever format that cable company decides to provide. Remember, the FCC has not mandated any technical changes for cable operators or satellite broadcasters at this time. Some cable companies have already announced plans to introduce digital cable TV set top boxes to their markets this year. They may choose, however, to use the digital capability to increase the number of channels available or to provide data capability, such as high speed modem rather than use the capability to transmit HDTV programming. Since the cable companies will provide the boxes used for converting the signals as they do today, you will not need a new TV to receive these programs.

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added 6/24/98 Zenith Unveils New '43 Series' PCZTV For Nation's Classrooms

Limited Availabilty Info - We are facing some serious delays shipping certain products, in particular televisions and TV/VCR Combo's. The manufacturers are not making the sets fast enough to fill orders. We think this situation should get better by mid to late July. If you need to order an item and you need it ASAP, please be sure to contact us. If the item you want isn't available, we can

help you find a similar item that is.

HDTV?? - Do you have questions about HDTV? Here is an [article from Panasonic](#) which addresses a number of issues regarding this new technology.

SOITA - We attended the 1997 conference in Dayton Ohio. Additional information and links to SOITA can be found [here](#).

www.cousinsvideo.com

We have moved our home pages to a new server and we now have our own domain name. This should make it easier for you to find us. If you have set any bookmarks to our old address; <http://members.aol.com/cousinsvid>, please update them. We will be removing the pages from the old server in the next couple of months.

Along with the new domain name we also have new email addresses.

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